

# **NOTICE**

**All drawings located at the end of the document.**

ADMIN REQUIRED

665  
INFORMATION  
ONLY

RFP/ER-SAF-93-DCON



ROCKY FLATS

**HEALTH AND SAFETY PLAN  
(HASP)  
OPERATION OF  
DECONTAMINATION FACILITIES  
ROCKY FLATS PLANT  
MAIN DECONTAMINATION  
FACILITY  
PROTECTED AREA  
DECONTAMINATION FACILITY**



**APRIL 1994**

**DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE**

A-0002-001254

**HEALTH AND SAFETY PLAN (HASP)  
OPERATION OF DECONTAMINATION FACILITIES  
ROCKY FLATS PLANT  
MAIN DECONTAMINATION FACILITY  
PROTECTED AREA DECONTAMINATION FACILITY**

**VERSION 0**

*EG&G - Rocky Flats, Inc.  
Rocky Flats Plant  
Golden, Colorado*

This is a  
**CONTROLLED DOCUMENT**  
EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT  
This is a RED Stamp

INFORMATION  
ONLY

**DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN**

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**Effective Date:**

**APR 15 1994**

**Organization:**

**Environmental Management**

**APPROVED BY:**

AK Schmichen

3-18-94

Project Manager

Date

Environmental Restoration

**APPROVED BY:**

MC Burniste

3-18-94

Department/Group Manager

Date

Environmental Restoration

**APPROVED BY:**

ML Brubaker For

3/18/94

Quality Assurance Program Manager

Date

Environmental Restoration

**DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN**

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**Effective Date:**

APR 15 1994

**Organization:**

**Environmental Management**

"Health And Safety Plan (HASP), Operation of Decontamination Facilities, Rocky Flats Plant, Main Decontamination Facility, Protected Area Decontamination Facility", prepared by Golder Associates Inc.

This site-specific Health And Safety Plan has been written for the use of EG&G-Rocky Flats, Inc., its employees and subcontractors. Personnel associated with this Project will comply with all aspects of this plan.

**REVIEW AND APPROVAL**

AKS Schmechen

EG&G Project Manager

3-18-94

Date

J. Milant

Health and Safety Liaison Officer

3-21-94

Date

Kurt C

Environmental Restoration Health and  
Safety Officer

3/21/94

Date

**DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN**

665 INFORMATION ONLY

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**APR 15 1994**

**Effective Date:**

**Organization:**

**Environmental Management**

"Health And Safety Plan (HASP), Operation of Decontamination Facilities, Rocky Flats Plant, Main Decontamination Facility, Protected Area Decontamination Facility", prepared by Golder Associates Inc.

This site specific Health And Safety Plan has been written for the use of EG&G-Rocky Flats, Inc., its employees and subcontractors. Personnel associated with this Project will comply with all aspects of this plan.

**SUBCONTRACTOR APPROVALS**

Chiff E Rife, Project HSO      3/18/94  
Name, Title      Date

James M. Rose, Program Manager      3/18/94  
Name, Title      Date

Sam J. Ples, SITE MANAGER      3/22/94  
Name, Title      Date

\_\_\_\_\_  
Name Title      Date

665  
INFORMATION  
ONLY

ROCKY FLATS PLANT  
DECONTAMINATION FACILITY  
HEALTH AND SAFETY PLAN (HASP)

Manual No.:

Section No.

Page:

Effective Date:

Organization: Environmental Restoration Mgmt

RFP/ER-SAF-93-DCON

Table of Contents, R2

1 of 2

07/18/94

TABLE OF CONTENTS  
HEALTH AND SAFETY PLAN (HASP)  
OPERATION OF DECONTAMINATION FACILITIES  
ROCKY FLATS PLANT  
MAIN DECONTAMINATION FACILITY  
PROTECTED AREA DECONTAMINATION FACILITY

<u>Section No.</u>	<u>Title</u>	<u>Rev. No.</u>	<u>Effective Date</u>
	Detailed Table of Contents	0	4/15/94
1.0	Project Identification	0	4/15/94
2.0	Staff Organization	0	4/15/94
3.0	Site History and Nature of Contamination	0	4/15/94
4.0	Work Activities and Sites	0	4/15/94
5.0	Hazard Assessment	0	4/15/94
94-DMR-ERM-0061	EQS and Subcontractor Text Addition	0	6/15/94
6.0	General Health and Safety Requirements	0	4/15/94
94-DMR-ERM-0061	EQS and Subcontractor Text Addition	0	6/15/94
•94-DMR-ERM-0068	RAD Engineering Modification	0	07/18/94
7.0	Site-Specific Health and Safety Requirements	0	4/15/94
94-DMR-ERM-0061	EQS and Subcontractor Text Addition	0	6/15/94
•94-DMR-ERM-0068	RAD Engineering Modification	0	07/18/94
8.0	Emergency Response Procedures	0	4/15/94
9.0	Logs, Reports, and Recordkeeping	0	4/15/94
10.0	References	0	4/15/94
LT	List of Tables	0	4/15/94
LF	List of Figures	0	4/15/94

ROCKY FLATS PLANT  
DECONTAMINATION FACILITY  
HEALTH AND SAFETY PLAN (HASP)

Manual No.:

Section No.

Page:

Effective Date:

Organization: Environmental Restoration Mgmt

RFP/ER-SAF-93-DCON

Table of Contents, R2

2 of 2

07/18/94

LIST OF APPENDICES

<u>Section No.</u>	<u>Title</u>	<u>Rev. No.</u>	<u>Effective Date</u>
APPA	Appendix A	0	4/15/94
94-DMR-ERM-0061	EQS and Subcontractor Text Addition	0	6/15/94
APPB	Appendix B	0	4/15/94
APPC	Appendix C	0	4/15/94
APPD	Appendix D	0	4/15/94
APPE	Appendix E	0	4/15/94

## DOCUMENT MODIFICATION REQUEST (DMR)

Page 1 of 2

Refer to 1-A01-PPG-001 for Processing Instructions.  
Print or Type All Information (Except Signatures)

2. Existing Document Number/Revision FP/ER-SAF-93-DCON			1. Date May 31, 1994		25. DMR. No. 94-DMR-ERM-0061	
4. Originator's Name/Phone/Page/Location A. Schmiechen/3191/4484/T891E			3. New Document Number or Document Number if it is to be changed with this Revision N/A		5. Document Title Decontamination Facility Health and Safety Plan	
6. Document Type <input type="checkbox"/> Procedure <input checked="" type="checkbox"/> Other HSP			7. Document Modification Type (Check only one) <input type="checkbox"/> New <input type="checkbox"/> Revision <input checked="" type="checkbox"/> Intent Change <input type="checkbox"/> Nonintent Change <input type="checkbox"/> Editorial Correction <input type="checkbox"/> Cancellation			
8. Item	9. Page	10. Step	11. Proposed Modifications			
1	30	5.2.2.2	Change last two sentences to read, "An equation which represents the potential for these compounds to become airborne has been derived using the Derived Air Concentration (DAC) values listed in DOE Order 5480.11, "Radiation Protection for Occupational Workers". The derived equation is as follows:"			
2	46	6.6.3.1	In fifth bullet, change "mobile" to "immobile".			
3	50	6.6.3.4	In the first sentence, change "or" to "and".			
4	71	7.2.1	From the first bullet sentence delete "low level beta".			
5	71	7.2.1	First full paragraph after bullets should read: "The Fidler is performance-checked on a 24-hour usage basis and calibrated yearly by EG&G Instrumentation. All other instruments are performance-checked by the Subcontractor HSS on a daily basis. The radiological instruments are calibrated by EG&G Instrumentation on a yearly basis or when calibration expires. The Ludlum Model 2929 is calibrated on an annual basis by the manufacturer."			
6	73	7.3.1	In the second paragraph, change "EMRG 3.2" to "Procedure 4-B96-ER-OPS-EMRG-03.02".			
7	76	7.3.2	Last paragraph on page, replace "...volatile organic compounds or concern..." with "... volatile organic compounds of concern..."			
8	80	7.4.2	Second bullet: change "wipe-tested" and "wipe test" to "smear tested" and "smear test".			
9	81	7.4.2	First bullet: change "wipe test" to "smear test".			
	92	7.5.3	Second paragraph after "PPE Requirements", second sentence: change "limits or" to "limits or".			
12. Justification (Reason for Modification, EJO#, TP#, etc.)						
All Items: To incorporate additional comments received to the Health and Safety Plan from the Subcontractor to the Project and from Environmental Quality Support. Correct numerous typographical errors that were identified throughout the document.						
If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concurror prints, and signs in Block 14, and dates in Block 15.						
13. Organization		14. Print and Sign (if applicable)			15. Date (if applicable)	
EOM		Marla Broussard <i>for M.C. Broussard</i>			6/3/94	
EQS		Mark Brooks (RR) <i>for M.C. Broussard</i>			6-6-94	
IH		Lisa LeLievre <i>for M.C. Broussard</i>			6/7/94	
RE		Jerry Anderson <i>for M.C. Broussard</i>			6/3/94	
SME		Keith Anderson <i>for M.C. Broussard</i>			6-3-94	
16. Originator's Supervisor (print/sign/date) M. C. Burmiester /s/ 05/24/94						
17. Assigned SME/Phone/Page/Location K. D. Anderson/6979/5142/080			18. Cost Center 0248		19. Charge Number ENV-HASP	
					20. Requested Completion Date 05/27/94	
					21. Effective Date 6/15/94	
22. Accelerated Review? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		23. ORC Review ORC Review Not Required: This Nonintent Change is being processed as an Intent Change to expedite the DMR process.				
Responsible Manager (print, sign, date) M. C. Broussard <i>for M.C. Broussard</i>						

REVIEWED FOR CLASSIFICATION/UCN

DOCUMENT CLASSIFICATION REVIEW WAIVER  
PER R.B. HOFFMAN, CLASSIFICATION OFFICE  
JUNE 11, 1991

BY - NA  
DATE - NA

Refer to 1-A01-PPG-001 for Processing Instructions.  
Print or Type All Information (Except Signatures)

25.

DMR. No. 94-DMR-ERM-~~10061~~

2. or 3. Document Number/Revision DEP/ER-SAF-93-DCON			3. Document Title Decontamination Facility Health and Safety Plan
Item	9. Page	10. Step	11. Proposed Modifications
11	94	7.5.5	Third paragraph: change "swipe samples" to "smear samples".
12	98	7.5.9	Second to last paragraph, replace with: "Sampling activities require Modified Level D PPE with coated disposable chemical-resistant coveralls such as poly-coated Tyvek™ (or equivalent)".
13	99	7.5.10	Third paragraph: change "swipe sample" to "smear sample".
14	107	8.4.3	First paragraph, after fifth bullet, add the following bullet: "Recommend that the individual consult with their personal physician".
15		Table 7-1	Change "EMRG 3.2" to "4-B96-ER-OPS-EMRG-03.02"
16	2	Ap. A	Add to the responsibilities of the Environmental Management Radiological Engineer " Stop work authority when unacceptable radiological conditions or hazards exist".
12. Justification (Reason for Modification, EIO#, TP#, etc.)			
See previous page.			

## Page 1 of 1

**Print or Type All Information (Except Signatures)**REVIEWED FOR CLASSIFICATION/UCNI

BY NA  
DATE NA

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

i of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

### TABLE OF CONTENTS

Page

1.0 PROJECT IDENTIFICATION .....	1
2.0 STAFF ORGANIZATION .....	2
3.0 SITE HISTORY AND NATURE OF CONTAMINATION .....	3
3.1 Rocky Flats Plant (RFP) .....	3
3.1.1 Physical Setting .....	3
3.1.2 Site Background .....	3
3.1.3 Rocky Flats Plant Operations .....	4
3.1.4 Previous Investigations .....	4
3.2 Creation of the Operable Units and Individual Hazardous Substance Sites (IHSS's) .....	5
3.3 Operable Unit 1 - 881 Hillside .....	6
3.4 Operable Unit 2 - 903 Pad, Mound, and East Trenches .....	7
3.5 Operable Unit 3 - Off-Site Releases .....	9
3.6 Operable Unit 4 - Solar Evaporation Ponds .....	10
3.7 Operable Unit 5 - Woman Creek Priority Drainage .....	11
3.8 Operable Unit 6 - Walnut Creek Priority Drainage .....	12
3.9 Operable Unit 7 - Present Landfill and Inactive Hazardous Waste Storage Area .....	14
3.10 Operable Unit 8 - 700 Area .....	15
3.11 Operable Unit 9 - Original Process Waste Lines .....	16
3.12 Operable Unit 10 - Other Outside Closures .....	16
3.13 Operable Unit 11 - West Spray Field .....	18
3.14 Operable Unit 12 - 400/800 Area .....	19
3.15 Operable Unit 13 - 100 Area .....	20
3.16 Operable Unit 14 - Radioactive Sites .....	21
3.17 Operable Unit 15 - Inside Building Closures .....	21
3.18 Operable Unit 16 - Low-Priority Sites .....	22

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

ii of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

## TABLE OF CONTENTS—continued

	<u>Page</u>
4.0 WORK ACTIVITIES AND SITES . . . . .	24
4.1 Introduction . . . . .	24
4.2 Activities . . . . .	24
4.3 Tasks . . . . .	25
4.4 Work Site . . . . .	27
5.0 HAZARD ASSESSMENT . . . . .	28
5.1 Overview . . . . .	28
5.2 Methodologies Used to Complete the Hazard Assessments . . . . .	29
5.2.1 Assessment Results and Methodology Employed to Assess Wildlife, Environmental Extremes, Physical Injuries and Electrical Shock When Working With Equipment . . . . .	29
5.2.2 Assessment Results and Methodology Employed to Assess Radioisotopes and Nonradioactive Potentially Hazardous Chemical Exposures . . . . .	30
5.2.2.1 The Absorption, Injection, and Ingestion Routes of Exposure . . . . .	30
5.2.2.2 The Inhalation Route of Exposure . . . . .	30
6.0 GENERAL HEALTH AND SAFETY REQUIREMENTS . . . . .	32
6.1 Medical Surveillance . . . . .	32
6.2 Safety Training . . . . .	32
6.2.1 40-hour Basic Training . . . . .	32
6.2.2 Three-Day On-Site Supervision . . . . .	33
6.2.3 Radiation Worker Training . . . . .	33
6.2.4 On-Site Supervisor . . . . .	33
6.2.5 Respirator Fit Testing . . . . .	33
6.2.6 Health & Safety Specialist (HSS) . . . . .	34
6.2.7 Operators of Powered Drum-Handling Equipment . . . . .	34

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

iii of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

## TABLE OF CONTENTS—continued

	<u>Page</u>
6.2.8 Site-Specific Safety Orientation Meeting . . . . .	34
6.2.9 Periodic Safety Meetings . . . . .	36
6.2.10 Lifting . . . . .	36
6.2.11 DF-Specific Training . . . . .	37
6.3 Visitor Clearances . . . . .	37
6.4 Buddy System . . . . .	37
6.5 Work Zones . . . . .	37
6.5.1 Exclusion Zone . . . . .	38
6.5.2 Contamination Reduction Zone (CRZ) . . . . .	39
6.5.3 Support Zone . . . . .	41
6.6 Field Activities . . . . .	42
6.6.1 Personal Requirements/Prohibitions . . . . .	42
6.6.2 Contamination/Exposure Prevention . . . . .	43
6.6.3 Heavy Equipment Operation . . . . .	44
6.6.3.1 General Requirements . . . . .	45
6.6.3.2 Operations . . . . .	47
6.6.3.3 Traveling . . . . .	49
6.6.3.4 Loading . . . . .	50
6.6.4 Heavy Materials Handling Safety . . . . .	51
6.6.5 Drum Handling . . . . .	51
6.6.5.1 General Requirements . . . . .	52
6.6.5.2 Opening and Sampling Drums . . . . .	53
6.6.6 Housekeeping . . . . .	54

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

iv of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

## TABLE OF CONTENTS--continued

### Page

6.7 Personal Protective Equipment (PPE) . . . . .	55
6.7.1 Clothing . . . . .	56
6.7.2 Steel-toed Boots, Safety Glasses, and Hard Hats . . . . .	57
6.8 Emergency Equipment . . . . .	57
6.9 Temperature Stress . . . . .	57
6.9.1 Heat Stress . . . . .	58
6.9.2 Heat Stress Monitoring . . . . .	59
6.9.3 Cold Stress . . . . .	60
6.9.4 Cold Stress Monitoring . . . . .	60
6.9.5 Training . . . . .	62
6.10 Work During Darkness . . . . .	62
6.11 Confined Space Work . . . . .	62
6.12 Thunderstorms and Tornadoes . . . . .	63
6.13 Hand Tools and Portable Power Tools . . . . .	64
6.13.1 General Requirements . . . . .	64
6.13.2 Hand Tool Requirements . . . . .	65
6.13.3 Power Tool Requirements . . . . .	66
6.14 Electrical Safety . . . . .	67
6.15 Noise . . . . .	69
7.0 SITE-SPECIFIC HEALTH AND SAFETY REQUIREMENTS . . . . .	70
7.1 Introduction . . . . .	70
7.2 Monitoring Instruments . . . . .	70
7.2.1 Radioactive Substance Monitoring Instruments . . . . .	70
7.2.2 Chemical Substance Monitoring Instruments . . . . .	72

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

v of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

### TABLE OF CONTENTS--continued

	<u>Page</u>
7.3 Monitoring Strategies . . . . .	72
7.3.1 Monitoring for Radioactive Substances . . . . .	73
7.3.2 Monitoring for Chemical Substances . . . . .	73
7.4 Personal Protective Equipment . . . . .	78
7.4.1 Clothing . . . . .	78
7.4.2 Respirators . . . . .	79
7.4.2.1 Respiratory Protection Program . . . . .	81
7.4.2.2 Respirator Decision Logic . . . . .	82
7.4.2.3 Respirator Action Levels . . . . .	82
7.4.3 Personal Protective Equipment Ensembles . . . . .	83
7.4.3.1 Level D . . . . .	84
7.4.3.2 Modified Level D . . . . .	84
7.4.3.3 Level C . . . . .	85
7.4.3.4 Level B . . . . .	86
7.5 Required Levels of Personal Protective Equipment Per Task . . . . .	88
7.5.1 FO.01: Air Monitoring and Dust Control . . . . .	88
7.5.2 FO.03: General Equipment Decontamination . . . . .	89
7.5.3 FO.04: Heavy Equipment Decontamination . . . . .	91
7.5.4 FO.05: Handling of Purge and Development Water . . . . .	93
7.5.5 FO.06: Handling Personal Protective Equipment . . . . .	93
7.5.6 FO.07: Handling of Decontamination Water and Wash Water . . . . .	95
7.5.7 FO.10: Receiving, Labelling, and Handling Environmental Materials Containers . . . . .	96
7.5.8 FO.11: Field Communications . . . . .	96
7.5.9 FO.12: Decontamination Facility Operations . . . . .	97
7.5.10 FO.13: Containerization, Preserving, Handling and Shipping of Soil and Water Samples . . . . .	99

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

vi of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

## TABLE OF CONTENTS--continued

	Page
7.5.11 FO.15: Photoionization Detectors (PID) and Flame Ionization Detectors (FID) . . . . .	100
7.5.12 FO.16: Field Radiological Measurements . . . . .	101
7.5.13 FO.18: Environmental Sample Radioactivity Content Screenig . .	102
7.5.14 FO.25: Shipment of Radioactive Materials Samples . . . . .	102
7.5.15 Other Tasks Conducted by the Decontamination Facility Subcontractor . . . . .	103
8.0 EMERGENCY RESPONSE PROCEDURES . . . . .	104
8.1 Radio Communications . . . . .	104
8.2 Emergency Telephone . . . . .	104
8.3 Medical Facilities . . . . .	104
8.4 Emergency Response Procedures . . . . .	105
8.4.1 Fire/Explosion . . . . .	106
8.4.2 Physical Injury . . . . .	106
8.4.3 Injury Due to Heat . . . . .	107
8.4.4 Injury Due to Cold . . . . .	108
8.4.5 Emergency Services . . . . .	109
8.4.6 Notification Requirements . . . . .	109
8.4.7 Spills . . . . .	110
8.4.8 Thunderstorms and Tornadoes . . . . .	110
8.4.9 Adverse Weather . . . . .	111
8.4.10 Electric Shock . . . . .	112
9.0 LOGS, REPORTS, AND RECORDKEEPING . . . . .	113
9.1 General . . . . .	113
9.2 Personnel Records . . . . .	113
9.3 Calibration Records . . . . .	113
9.4 Occupational Safety and Health Administration Form (OSHA FM) 200 . . .	113
9.5 Health and Safety Logbook . . . . .	114
9.6 Accident/Incident Reporting . . . . .	114

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

vii of vii

Effective Date:

APR 15 1994

Organization:

Environmental Management

## TABLE OF CONTENTS--continued

	<u>Page</u>
9.6.1 Subcontractor Procedures . . . . .	114
9.6.2 Rocky Flats Plant Procedures . . . . .	115
10.0 REFERENCES . . . . .	117

## LIST OF TABLES

Table 5-1	Compounds of Concern
Table 6-1	Signs and Symptoms of Heat Stress
Table 6-2	Permissible Heat Exposure Limits
Table 7-1	Environmental Management Radiological Guidelines
Table 7-2	PPE Action Levels for Compounds of Concern
Table 7-3	Task-Specific PPE Requirements
Table 8-1	Emergency Alarms
Table 8-2	Emergency Telephone Numbers

## LIST OF FIGURES

Figure 3-1	Rocky Flats Plant Site Map
Figure 4-1	Main Decontamination Facility Site Plan
Figure 4-2	Protected Area Decontamination Facility Site Plan
Figure 4-3	Typical Decontamination Facility Process Flow Diagram
Figure 8-1	Medical Facility Map

## LIST OF APPENDICES

Appendix A	Responsibilities and Authority of Health and Safety Personnel
Appendix B	Characteristics of Radioisotopes Found at Rocky Flats Plant
Appendix C	List of Chemical Substances Found at Rocky Flats Plant
Appendix D	Example On-the-Job Training (OJT) Form
Appendix E	Special Task Health and Safety Plan

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

1 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

## 1.0 PROJECT IDENTIFICATION

Project Name: Decontamination Facility Operation

Project Location: Rocky Flats Plant  
Jefferson County, Colorado

This Health And Safety Plan (HASP) presents requirements for work to be performed at Rocky Flats Plant, specifically the tasks described in Section 4.0 of this plan. This HASP is the property of EG&G Rocky Flats, Inc. (EG&G). Subcontracted Decontamination Facility (DF) operators or users must abide by the conditions set forth in this HASP. Each subcontractor will demonstrate adoption of the HASP by signing the subcontractor approval page at the beginning of this document and providing EG&G with a letter of adoption.

This HASP is in compliance with applicable sections of 29 CFR 1910.120 and 29 CFR 1926 and is prepared for Decontamination Facilities Subcontractor (DFSC) and Decontamination Facility users. Subcontractors will not use this plan for tasks other than those described in Section 4.0, nor will they modify or use this HASP without written approval by the EG&G Project Manager (PM), and the EG&G Health and Safety Officer (HSO), the EG&G Health and Safety Liaison Officer, and the EG&G Quality Assurance (QA) Manager. This plan is not valid unless it is signed and dated by the EG&G individuals identified above. Controlled document signature pages are provided following the HASP cover page.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

2 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 2.0 STAFF ORGANIZATION

The roles of the various subcontractor project positions as they pertain to health and safety are derived from Environmental Management Restoration Guideline (EMRG) 1.0. The responsibilities and authority of each position are presented in Appendix A.

DFSC Personnel with any Health and Safety responsibilities will be identified by the titles provided in Appendix A. A listing of individuals fulfilling those roles will be provided to the EG&G PM.

Any DFSC personnel to be assigned to field activities must be approved by the DFSC Health and Safety Specialist (HSS) or Health and Safety Officer (HSO) before they begin any field work at the DF.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

3 of 119  
APR 13 1994

Effective Date:

Organization:

Environmental Management

---

### 3.0 SITE HISTORY AND NATURE OF CONTAMINATION

#### 3.1 Rocky Flats Plant (RFP)

##### 3.1.1 Physical Setting

The Rocky Flats Plant (RFP) is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver. The cities of Boulder, Broomfield, Westminster, and Arvada are located less than 10 miles to the north, northeast, east, and southeast, respectively. RFP consists of approximately 6,550 acres of federal land and occupies Sections 1 through 4 and 9 through 15 of Township 2 South, Range 70 West, 6th Principal Meridian. RFP is depicted in Figure 3-1. Major plant buildings are located within a RFP security area of approximately 400 acres. The security area is surrounded by a buffer zone of approximately 6,150 acres. RFP is generally bounded on the north by State Highway 128. To the east is Jefferson County Highway 17, also known as Indiana Street; to the south are agricultural and industrial properties, and State Highway 72; and to the west is State Highway 93.

##### 3.1.2 Site Background

RFP is a government-owned and contractor-operated facility that is part of the nationwide nuclear weapons production complex. RFP was operated for the U. S. Atomic Energy Commission (AEC) from RFP's inception in 1951 until the AEC was dissolved in January 1975. At that time, responsibility for RFP was assigned to the Energy Research and Development Administration (ERDA), which was succeeded by the Department of Energy (DOE) in 1977. Dow Chemical USA, an operating unit of the Dow Chemical Company, was the managing and operating contractor of the facility from 1951 until June 30, 1975. Rockwell International

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

4 of 119

Effective Date:

APR 1 1994

Organization:

Environmental Management

---

succeeded Dow Chemical USA from July 1, 1975 to January 1, 1990, when EG&G Rocky Flats, Inc. succeeded Rockwell International.

### 3.1.3 Rocky Flats Plant Operations

Until 1992, RFP's primary mission was to produce metal components for nuclear weapons. These components were fabricated from plutonium, uranium, and nonradioactive metals, principally beryllium and stainless steel. Parts made at the plant were shipped elsewhere for final assembly. When a nuclear weapon is determined to be obsolete, components of these weapons which had been fabricated at RFP are returned for special processing which recovers plutonium. Other activities at RFP include research and development in metallurgy, machining, nondestructive testing, coatings, remote engineering, chemistry, and physics.

### 3.1.4 Previous Investigations

Various studies have been conducted at RFP to characterize environmental media and to assess the extent of radiological and chemical contaminant releases to the environment. These have included geological studies, surface water and groundwater studies, and geophysical and radiometric surveys. Several environmental, ecological, and public health studies culminated in the Final Site-wide Environmental Impact Statement (DOE 1980).

In 1986, two major environmental investigations were completed at RFP. The first was the Comprehensive Environmental Assessment and Response Program (CEARP) Installation Assessment (DOE 1986a), which included analyses and identification of current operational activities, active and inactive waste sites, current and past waste management practices, and potential environmental pathways through which contaminants could be transported. A number

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

5 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

of sites that could potentially have adverse impacts on the environment were identified. These sites were divided into three categories:

- ▶ Hazardous waste management units that will continue to operate and need a Resource Conservation and Recovery Act (RCRA) Part A operating permit;
- ▶ Hazardous waste management units that will be closed under RCRA interim status; and,
- ▶ Inactive waste management units that will be investigated and cleaned up under Section 3004 (u) of RCRA or under CERCLA.

The second major environmental investigation completed at RFP in 1986 involved a hydrogeologic and hydrochemical characterization of the entire RFP site. Results of these investigations were reported by Rockwell International in 1986. Investigation results indicated four areas to be significant contributors to environmental contamination, with each area containing several sites. Those areas are commonly referred to as the 881 Hillside Area, the 903 Pad Area, the Mound Area, and the East Trenches Area.

### 3.2 Creation of the Operable Units and Individual Hazardous Substance Sites (IHSS's)

The Draft Installation Assessment under the Comprehensive Environmental Restoration Program (CERP), formerly the Comprehensive Environmental Assessment and Response Program (CEARP) (DOE 1986a), appears to have been the first document to compile a list of potential hazardous waste sites at RFP. The Assessment also attempted to prioritize the sites on the basis of EPA's Hazard Ranking System (HRS) and DOE's Modified HRS scoring. High priority sites, such as the 881 Hillside, were recommended for further investigation and remedial investigations commenced at the high priority sites. The RCRA Part B Permit Application

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

6 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

(DOE 1986b, DOE 1986c) for the RFP was completed in November 1986 for RFP hazardous waste management units that would continue to operate. Appendix 1 of the permit application (DOE 1987), RCRA 3004 (u) Waste Management Units, defined the inactive waste sites as solid waste management units (SWMUs). A plan for investigating the remaining sites, referred to as the low priority sites, was prepared in 1988. This plan identified 103 low priority SWMUs and recommended appropriate additional investigations. The plan also presented groups of SWMUs based on their geographical locations, similar contaminants, and applicable pathways. The SWMUs were combined into ten Operable Units (OUs) in the Draft Interagency Agreement (IAG) (IAG 1990).

Additional SWMUs were added to the IAG based on the Part B RCRA application and independent reviews of aerial photographs and facility submittals. A total of 178 SWMUs were identified. The ten OUs were reprioritized and divided into sixteen OUs (Operable Units 1 through 16) in the final IAG (1991). The SWMUs were also renamed Individual Hazardous Substances Sites (IHSS's) in the final IAG. The term IHSS is used in the remainder of this Section.

### 3.3 Operable Unit 1 - 881 Hillside

Information on the nature and extent of contamination is taken from the Final Phase III RFI/RI Work Plan, Rocky Flats Plant, 881 Hillside Area Operable Unit No. 1 (DOE 1990). Section 2.3.1 of that Work Plan describes how background levels of chemical constituents were calculated. Section 2.3 and the Appendixes of that Work Plan present available analytical data.

Phase I and Phase II soils investigations indicated tetrachloroethene, trichloroethene, and 1,1,1-trichloroethane contamination in some samples at the 881 Hillside. Plutonium and americium

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

7 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

were detected above background in soil samples that include the ground surface; however, windblown dust from the 903 Pad (OU2) is the suspected source of these radionuclides. Tetrachloroethene and trichloroethene are the principle volatile organic compounds which have been detected in surface water samples in the area. Numerous metals and other inorganic compounds have occasionally been above background. Gross alpha, gross beta, uranium, and plutonium exceed background in many of the surface water samples.

Groundwater is contaminated in both the eastern and western portion of the 881 Hillside. The most pronounced organic contamination is in the eastern portion of the Hillside area, with tetrachloroethene, trichloroethene, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and carbon tetrachloride reaching several thousand micrograms per liter in many samples. Organic contamination in the western portion of the 881 Hillside area occurs at much lower concentrations. Concentrations of metals and inorganic constituents in the eastern portion of the study area include numerous occurrences of nickel, strontium, selenium, zinc, copper, and uranium above background.

### 3.4 Operable Unit 2 - 903 Pad, Mound, and East Trenches

Information on the nature and extent of contamination is taken from the Phase II RFI/RI Work Plans for Alluvial and Bedrock, 903 Pad, Mound, and East Trenches Areas (Operable Unit 2) (DOE 1991a, DOE 1991b). Section 2.3 of the Work Plan describes how background levels of chemical constituents were calculated. Section 2.3 and the Appendixes of the Work Plan present available analytical data.

Plutonium and americium occur above background in surface soils. Other radionuclides and trace metals occur at low concentrations and are infrequently above background but may also

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

8 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

be soil contaminants. Data suggest plutonium and americium were released to soils in the area via wind dissemination during clean-up efforts at the 903 Drum Storage Site.

Based on existing results, carbon tetrachloride, tetrachloroethene, and trichloroethene are the primary volatile organic contaminants found in the upper hydrostratigraphic unit groundwater flow system. Trace elements commonly occurring above background in groundwater include strontium, barium, copper, and nickel, and to a lesser extent, chromium, manganese, selenium, lead, zinc, and molybdenum. Also, major cations and anions and total dissolved solids are somewhat elevated above background throughout and downgradient of the OU. Uranium-238 is the predominant radionuclide occurring above background in the upper groundwater, but a few samples indicate plutonium and americium downgradient of the 903 Pad and possibly north of the Mound.

There is considerable interaction between surface water and groundwater. As a result, organic contamination is observed in seeps downgradient of the 903 Pad and in the upper reaches of South Walnut Creek at the Mound Area. Also, somewhat elevated concentrations of total dissolved solids, major ions, strontium, zinc, and uranium are present at many of the surface water stations. Plutonium and americium are also observed in two seeps downgradient of the 903 Pad and in the upper reaches of South Walnut Creek. This may be attributed to the water from the seeps coming in contact with surface soils exhibiting elevated concentrations of these radionuclides.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

9 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 3.5 Operable Unit 3 - Off-Site Releases

Information on the nature and extent of contamination is taken from Final RFI/RI Work Plan for Operable Unit 3, Rocky Flats Plant (DOE 1991c).

IHSS 199, Contamination of the Land's Surface, is comprised of 350 acres of land with concentrations of plutonium greater than 0.9 picocuries per gram. Hot spots may occur outside the designated acreage; however, it is reasonable to assume that areas outside the designated acreage contain lower concentrations of plutonium than the designated areas. Remediation has been implemented on 120 of the 250 acres of contaminated land owned by Jefferson County. Tilling of the 120 acres resulted in soil concentrations below the mandated cleanup level. Revegetation of this land is in progress. Very few data exist for contaminants other than plutonium.

Sampling at Great Western Reservoir (IHSS 200) indicates that layers of sediment containing plutonium above background levels are present in the bottom of the reservoir. Plutonium exists in discrete sediment horizons (at depths of 17 inches and 7.5 inches) corresponding to historical releases from RFP. The highest concentrations are found in the deepest areas of the reservoir. There is no evidence of plutonium migration through the sediment column. Concentrations of plutonium and other radionuclides in water at the reservoir are below background levels and/or EPA drinking water standards.

Radioactive materials released from RFP may have been transported to Standley Lake (IHSS 201) through surface water and/or airborne particulates. Plutonium has been measured in sediment in the lake. The concentrations in the sediment layers exceeded baseline levels beginning in the 1966 layer, peaked in 1969, and declined after 1969. The time period

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

10 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

correlates with the known period of windblown plutonium release from the 903 Pad at RFP. Studies of the sediments concluded that plutonium rapidly and almost irreversibly attaches itself to clay sediments. In 1974, Battelle conducted an investigation of radionuclide concentrations in reservoirs and streams near RFP. Concentrations of plutonium-239, plutonium-240, and americium-241 in the water at the lake were above the expected atmospheric fallout background, which was not specifically quantified in the study, but were more than four orders of magnitude below EPA National Primary Drinking Water Regulation of 15 pCi/L for total long-lived alpha activity.

Only very limited data have been collected to characterize Mower Reservoir (IHSS 202). RFP-derived contaminants in the reservoir are believed to have been transported primarily as airborne particulates, and, to a lesser degree, by surface water through the Woman Creek drainage. It can be inferred that contaminant concentrations resulting from releases into Woman Creek would be similar for Mower Reservoir and Standley Lake, while concentrations resulting from airborne releases and from erosion and transport of contaminated soils by surface runoff would be similar for Mower Reservoir and Great West Reservoir. It is expected that Mower Reservoir received similar amounts of plutonium through airborne transport as the nearby land surface.

### 3.6 Operable Unit 4 - Solar Evaporation Ponds

Information on the nature and extent of contamination is taken from the Draft Final Phase I RFI/RI Work Plan (DOE 1991d) and Environmental Assessment, Dewatering and RCRA Partial Closure Action on Solar Evaporation Ponds, Rocky Flats Plant (DOE 1991e). Section 2.5 of the Work Plan describes the calculation of background concentration and summarizes the chemical data for OU4.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

11 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

Liquids and sludges in the Solar Evaporation Ponds contain detectable levels of the radionuclides plutonium, americium, tritium and uranium. Metals of interest in the liquids and sludges include beryllium, cadmium, chromium and nickel. Nitrates are also a major constituent of the liquids and sludges. Soil samples in the vicinity of the solar ponds contain concentrations of chromium, nickel, nitrate, potassium, sodium, calcium, magnesium, and radionuclides that are likely attributable to the Solar Ponds. Low levels of nitrates and radionuclides have been detected in both alluvial and bedrock groundwater. Surface water in the form of seeps near the solar ponds contains nitrate, metal and radionuclides.

### 3.7 Operable Unit 5 - Woman Creek Priority Drainage

Information on the nature and extent of contamination is taken from Section 2.0 of the Final Phase I RFI/RI Work Plan, Woman Creek Priority Drainage (Operable Unit No. 5) (DOE 1991f).

The Original Landfill (IHSS 115) received numerous materials during its operation. Chemicals that may have been placed in the Original Landfill include commonly used solvents, such as trichloroethylene, carbon tetrachloride, tetrachloroethylene, petroleum distillates, 1,1,1-trichloroethane, dichloromethane, benzene, paint and paint thinners. Metals such as beryllium, uranium, lead, and chromium may also be present. Radiological surveys of the area have indicated the presence of radionuclides, and some soil containing uranium was previously removed from the Original Landfill. Metals and radionuclides have been detected in groundwater near the Original Landfill.

The nature and extent of contamination at the Ash Pits, Incinerator and Concrete Wash Pad (IHSS's 133.1 through 133.6) are not well known. General combustible wastes from RFP were

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

12 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

burned in the incinerator along with as estimated 100 grams of depleted uranium. Metals were detected in Ash Pit 3. Metals and radionuclides have been detected in groundwater wells near the Ash Pits.

Detention ponds C-1 and C-2 have been regularly sampled in recent years. Water in the ponds is known to contain detectable concentrations of metals and radionuclides, but background levels have not been determined for the Woman Creek area. Sediment samples also contain measurable metals and radionuclides.

### 3.8 Operable Unit 6 - Walnut Creek Priority Drainage

Information on the nature and extent of contamination is taken from Section 2.0 of the Final Phase I RFI/RI Work Plan, Walnut Creek Priority Drainage (Operable Unit No. 6) (DOE 1991g).

Ponds A-1 and A-2 contain radionuclides including plutonium and uranium in both the water and the sediments. Pond A-3 is reported to contain elevated uranium-233/234 and uranium-238 concentrations like Pond A-2. Water quality in Pond A-4 is similar to background levels. Pond B-1 has moderately elevated uranium-233/234 and uranium-238 concentrations, and plutonium is reported in both the water and the sediments. Pond B-2 water contains background levels for the various radionuclides except plutonium. Pond B-3 has detectable plutonium as well as zinc and nitrates. Ponds B-4 and B-5 have detectable levels of uranium-233/234 and 238. Ground water in the vicinity of the A- and B-series ponds contain several metals and radionuclides above detection limits but these concentrations could represent background levels.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**13 of 119**

**Effective Date:**

**APR 15 1994**

**Organization:**

**Environmental Management**

---

No previous studies have been conducted at the four spray fields. However, analytical results from water samples collected from the East and West Landfill Ponds provide significant data regarding the North, South and Pond Area Spray Fields (IHSS's 167.1-3). Strontium and tritium were detected in the Landfill Ponds water. In addition, minor organics and several metals and radionuclides have been reported in surface water and groundwater samples collected near the spray fields. Analytical data from Pond B-3 water provides data regarding the East Area Spray Field (IHSS 216.1). Radionuclides and metals have been detected in the water from Pond B-3.

Only one previous soils investigation has reportedly been conducted at Trench A. Uranium-233/234 and 238, and several volatile organics were detected in the soils. Metals, radionuclides and one volatile organic compound have been detected in groundwater in the vicinity of the trenches. No previous studies have been conducted at the Sludge Dispersal Area (IHSS 141). A potential for contamination within the drying beds by a variety of chemicals in the sludge, particularly plutonium, is possible. Volatile organics, metals, and radionuclides have been detected in groundwater and surface water samples downgradient of the IHSS.

At the Triangle Area (IHSS 165), previous radiometric soil surveys have indicated the presence of radionuclides. The contaminated soils were removed on several occasions following the soil surveys. Metals, radionuclides and organic compounds have been detected in groundwater near the area.

Previous soils investigations at the Old Outfall (IHSS 143) reported elevated levels of plutonium and organics. Contaminated soils were removed from the site in 1971. Metals and radionuclides have been detected in surface water samples taken downgradient of the IHSS.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

14 of 119

Effective Date:

APR 25 1994

Organization:

Environmental Management

---

No previous investigations have been completed at the Soil Dump Area. The soils may contain plutonium.

### 3.9 Operable Unit 7 - Present Landfill and Inactive Hazardous Waste Storage Area

Since little direct characterization of the types of contaminants in the landfill or inactive storage area has been conducted to date, most of what is known is based on waste stream identification studies and groundwater and surface water quality monitoring (DOE 1991h). Previous evaluations of groundwater quality from wells at the periphery of the landfill indicate the landfill contributes calcium, bicarbonate, and, to a lesser extent, sulfate, iron, manganese, zinc, and strontium to the groundwater. Volatile contamination, primarily trichloroethylene and 1,1,1-trichloroethane, has been found sporadically and at low concentrations in groundwater in some areas at the landfill periphery. Elevated uranium and tritium levels also exist in some areas. Soil contamination has not been characterized, but it may be reasonable to assume that the nature of contamination is similar to the groundwater contamination.

The primary mechanism for release of contaminants from the Present Landfill into the affected media appears to be by percolation of groundwater (leachate) through the wastes and then out of the landfill. Groundwater flow exiting the wastes can potentially distribute contamination vertically downward and laterally downgradient. In the case of the Inactive Hazardous Waste Storage Area, any spilled material could be released by percolation into the landfill wastes.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

15 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 3.10 Operable Unit 8 - 700 Area

Since previous investigations have not been conducted at these units, the nature and extent of contamination is based on materials stored at the sites and on previous site uses. (Rockwell International 1988, DOE 1987, DOE 1992a, DOE 1992b.)

Materials stored in the tanks involved in the Multiple Solvent Spills (IHSS's 118.1 and 188.2) included carbon tetrachloride, petroleum distillates, paint thinners, 1,1,1-trichloroethane and methyl ethyl ketone. Process wastes, typically containing uranium, solvents, oils, beryllium, nitric acid, hydrochloric acid, and fluoride, were released from Valve Vault 7 (IHSS 123.1). Cooling Tower Blowdown from IHSS's 135, 137, and 138 typically contained algicides and chromates. The 1976 spill from IHSS 138 also contained some radioactivity. The 1990 spill from IHSS 138 contained phosphates. Materials stored in the tanks involved in the Caustic/Acid Spills (IHSS's 139.1 and 139.2) included hydrochloric, hydrofluoric, nitric and sulfuric acids, and sodium hydroxide and potassium hydroxide. Spills of #2 fuel oil were the cause of IHSS 151, Fuel Oil Leak. A spill of a mixture of nitric and hydrochloric acid was the cause of the Acid Leak (IHSS 188).

The Sewer Line Break (IHSS 144) involved the release of radioactive laundry wastewater. The radioactive Liquid Leaks (IHSS 150.1-8) were primarily releases of liquid process wastes containing radioactive compounds and solutions containing caustics and acids.

The Radioactive Sites - 700 Area (IHSS 163.1 and 163.2) and Radioactive Sites - 900 Area (IHSS 173) may have been contaminated with radioactive compounds including americium. No radioactivity above background levels has been detected by radiometric surveys of the IHSS 163 locations. Radioactivity has been measured at IHSS 173. Radiometric surveys have not detected

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

16 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

radioactivity above background levels at the Building 991 Steam Cleaning Area (IHSS 184). The Central Avenue Waste spill (IHSS 172) consisted of less than 100 gallons of plutonium contaminated oils and oils with lathe coolant (hydraulic oil and carbon tetrachloride).

### 3.11 Operable Unit 9 - Original Process Waste Lines

Information on the nature and extent of contamination is taken from Draft Final Phase I RFI/RI Work Plan, Original Process Waste Lines (Operable Unit No. 9) (DOE 1991i).

Low-level radioactive aqueous wastes with high nitrate concentrations were a primary OPWL waste stream. Volatile and semivolatile organics were transferred through the OPWL in small quantities. Numerous acids were discharged to the OPWL, as well as bases, metals, and small quantities of other liquids, including pickling liquor from foundry operations, medical decontamination fluids, miscellaneous laboratory wastes, and laundry effluent. Releases from the OPWL and associated IHSS's may have occurred as a results of leakage, deterioration of pipes, breakage, and overflows. The lateral and vertical extent of releases are not precisely known but are expected to be largely confined to the pipeline trench backfill materials and adjacent soils.

### 3.12 Operable Unit 10 - Other Outside Closures

Information on the nature and extent of contamination is taken from Draft Final Phase I RFI/RI Work Plan, Rocky Flats Plant, Other Outside Closures (Operable Unit No. 10) (DOE 1991j).

Analytical results for soil samples taken in the vicinity of the Oil Leak (IHSS 129) indicate the presence of organics including 1,1,1-trichloroethane, methylene chloride, benzene, toluene,

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**17 of 119**

**Effective Date:**

**APR 15 1994**

**Organization:**

**Environmental Management**

---

ethylbenzene, 2-butanone, and total xylenes, and metals including mercury, cadmium, copper, and lead. Radionuclides were not tested. Groundwater data are not available for this site.

No previous investigations have been performed at the P.U.&D. Storage Yard (IHSS 170) so the nature and extent of contamination is unknown. Soil sampling has been conducted at the Waste Spills (IHSS 174). Soils contain concentrations of volatile organics, metals, nitrates, and radionuclides above background levels. Acetone, methylene chloride and nitrate/nitrite were detected in a groundwater sample from a well northeast of IHSS's 170 and 174.

Soil samples were collected in the S&W Building 980 Container Storage Facility (IHSS 175) area in 1988. Volatile organics, metals, nitrate, and radionuclides were detected above background levels in the samples. No groundwater data are known to have been collected.

Analysis of soil samples taken from borings in the S&W Contractor Storage Yard (IHSS 176) indicate levels of volatile organics, metals, nitrate, and radionuclides above background concentrations. Groundwater data from an upgradient well indicate the presence of metals, other inorganics, and radionuclides above background levels.

Potential contaminants at IHSS 207, Former Building 444 Acid Dumpsters, are cadmium, chromium, lead, silver, and radionuclides. No previous soil or water sampling investigations have been performed at the IHSS.

No previous investigations have been conducted at the Inactive 444/447 Waste Storage Area (IHSS 208) or Unit 16, Building 980 Cargo Container (IHSS 210), so no information is available concerning the nature and extent of contamination.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

18 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Analysis of soil samples taken in the area of the Unit 15, 904 Pad Pondcrete Storage Area (IHSS 213) indicated levels above background for gross alpha, gross beta, total plutonium, total uranium, uranium-234, uranium-238, americium-241, and plutonium-239. In addition, analysis of surface water samples taken in the area of IHSS 213 indicates levels above background for nitrate, cyanide, and cadmium. Further data are needed to assess groundwater contamination.

Soil samples taken from the Unit 25, 750 Pad Pondcrete and Saltcrete Storage Area (IHSS 214) indicate levels above background for gross alpha and gross beta. Surface water samples have levels above background for nitrate, cyanide, and cadmium. Further data are needed to assess groundwater contamination.

### 3.13 Operable Unit 11 - West Spray Field

Information on the nature and extent of contamination is taken from Final Phase I RFI/RI Work Plan for OU11 (West Spray Field), Rocky Flats Plant (DOE 1991k).

The source of contamination to the West Spray Field is the liquids from the Solar Evaporation Ponds that were sprayed at the spray field. The liquids are known to contain major ions, radionuclides, metals, and some organics. Previous sampling has been done at the West Spray Field, and the results have been compared to background levels in the area.

Soil samples from the spray field show slightly elevated levels of arsenic, lead, manganese, mercury, zinc and several volatile organic compounds. Gross alpha, plutonium, uranium-233, -234, and -238 are also above background levels in soils. Groundwater monitoring wells have been installed in the West Spray Field. Alluvial groundwater quality is affected sporadically by several metals, radionuclides, nitrate, and tetrachloroethylene. Two of the three bedrock wells

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

19 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

have occasionally exhibited above-background concentrations of magnesium, strontium, and manganese. The radionuclides and volatile organic compounds were not elevated. Surface water sampling has not been done at the West Spray Field.

### 3.14 Operable Unit 12 - 400/800 Area

Since previous investigations have not been conducted at these units, the nature and extent of contamination is based on materials stored at the sites and previous site uses (Rockwell International 1988, DOE 1992a).

Releases of radionuclides from buildings adjacent to the Multiple Solvent Sites (IHSS's 116.1 and 116.2) may have resulted in soil contamination at these sites. Since the actual contents of the drums stored on the loading docks are unknown, it is assumed that volatile organic compounds may have been stored and may have leaked in the dock areas.

At the Building 664 Fiberglassing Areas (IHSS's 120.1 and 120.2), the chemicals of interest are believed to be polyester resins (styrene monomer) and cleaning solvents. Also, an area of significantly high radiation was measured directly west and overlapping the site.

The potential contaminant at the Cooling Tower Ponds (IHSS's 136.1 and 136.2) is chromium. Blowdown discharged to the ponds contained chromium and algicides. Uranium may also be buried at the pond sites.

The Process Waste Leaks (IHSS 147.2) area may have been contaminated by infiltration of water that contacted equipment stored at the site. The Radioactive Site South Area (IHSS 157.2) may be contaminated by uranium, beryllium and solvents. Plutonium may also be present.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

20 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

Contamination is not expected at the Acid Leak sites (IHSS 187) or the Multiple Acid Spills (IHSS 189) since the acid was likely neutralized in the soil.

### 3.15 Operable Unit 13 - 100 Area

Since previous investigations have not been conducted at these units, the nature and extent of contamination is based on materials stored at the sites and previous site uses (Rockwell International 1988, DOE 1992a).

The Chemical Storage Sites (IHSS 117.1-3) were used for storage of acids, organic solvents, soaps, and oils. These materials are assumed to be the potential contaminants at these IHSS's.

The Oil Burn Pit No. 1 Waste Leak (IHSS 128) is a pit area that contains approximately 70 cubic feet of depleted uranium. The Lithium Metal Destruction Site (IHSS 134) may contain residues of lithium and small amounts of sodium, calcium, and magnesium. The lithium has likely reacted with the soil to form lithium carbonate. Radionuclides may have been spilled at the Waste Spill (IHSS 148) site, although radioactive surveys of the area have found radioactivity levels consistent with background levels.

Fuel oil is the potential contaminant at the Fuel Oil Tank Spill (IHSS 152). The Radioactive Site South Area (IHSS 157.1) may be contaminated by uranium, beryllium and solvents. Plutonium may also be present. The Radioactive Site - Building 551 (IHSS 158) is suspected of being contaminated with uranium. The Waste Drum Peroxide Burial (IHSS 169) may still contain peroxide, which can be an explosion hazard. The site is not considered to be a chemical hazard. Residues of the burning of waste solvents are the concern at the Solvent Burning Ground (IHSS 171).

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

21 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Radioactive process waste may have contaminated the Valve Vault 12 (IHSS 186) area. Sodium hydroxide is the potential contaminant at IHSS 190, the Caustic Leak. However, it is likely that any sodium hydroxide remaining in the environment would have been neutralized by the buffering action of the soil. The soil also would have buffered any remaining hydrogen peroxide from the Hydrogen Peroxide Spill (IHSS 191).

### 3.16 Operable Unit 14 - Radioactive Sites

Since previous investigations have not been conducted at these units, the nature and extent of contamination is based on materials stored at the sites and previous site uses (Rockwell International 1988, DOE 1992a).

Radioactive Site #1 - 700 Area (IHSS 131) and Radioactive Burial Site - Building 334 Parking Lot (IHSS 156.1) may have been contaminated by plutonium. Small amounts of plutonium and uranium may have remained at the Building 444 Parking Lot (IHSS 160) and Building 664 (IHSS 161); however, no radioactivity above background levels was detected during the radiometric survey of the area. The radioactive hot spots in the pavement on 8th Street may still exist as Radioactive Site #2 - 700 Area (IHSS 162). Radioactivity may also exist at the Radioactive Sites in the 800 Area (IHSS 164.1-3).

### 3.17 Operable Unit 15 - Inside Building Closures

Since previous investigations have not been conducted at these units, the nature and extent of contamination is based on materials stored at the sites and previous site uses (DOE 1988, DOE 1987, DOE 1992a).

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

22 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

Hazardous wastes such as volatile organic compounds and low-level radioactive waste oil have been stored in the Building 881 Drum Storage Area (IHSS 178). Waste oil contaminated with beryllium, and chlorinated solvents have been stored in the Building 865 Drum Storage Area (IHSS 179). Waste oil contaminated with volatile organic compounds, beryllium and radioactivity have been stored at the Building 883 Drum Storage Area (IHSS 180)

Uranium chips, coated with freon TF and 1,1,1-trichloroethane, were handled in the Original Chip Roaster (IHSS 204). The freon and 1,1,1-trichloroethane burned away during the roasting process.

Low-level radioactive mixed wastes, including low-level combustibles, low-level metal and glass, low-level combustible hazardous waste and low-level glass and metal hazardous waste, were stored at Unit 26, Building 881 Drum Storage (IHSS 211). Transuranic wastes and solvents such as carbon tetrachloride, 1,1,1-trichloroethane, and toluene are stored in Unit 63, Building 371 Drum Storage (IHSS 212). Up to 4 liters of cyanide- contaminated laboratory wastes were stored in Unit 32, Building 881 Cyanide Bench Scale Treatment (IHSS 217).

### 3.18 Operable Unit 16 - Low-Priority Sites

Since previous investigations have not been conducted at these units, the nature and extent of contamination is based on materials stored at the sites and previous site uses (Rockwell International 1988, DOE 1992a).

The Solvent Spill (IHSS 185) was a spill of 1,1,1-trichloroethane. The Antifreeze Discharge (IHSS 192) was a spill of ethylene glycol. The spill was contained in Pond B-1. The Steam Condensate Leak (IHSS 193) contained amines. The Steam Condensate Leaks (IHSS 194)

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**23 of 119**

**Effective Date:**

**APR 15 1994**

**Organization:**

**Environmental Management**

---

contained tritium. Nickel carbonyl is highly volatile and long-term environmental hazard would not result from the Nickel Carbonyl Disposal (IHSS 195).

Based on past uses, the water in the Water Treatment Plant Backwash Pond (IHSS 196) would have contained flocculates (aluminum sulfates and lime), residual chlorine, and suspended solids.

Transformers containing PCBs may have been disposed at the Scrap Metal Sites (IHSS 197).

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

24 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 4.0 WORK ACTIVITIES AND SITES

#### 4.1 Introduction

This health and safety plan (HASP) covers certain activities when they are accomplished at the Main Decontamination Facility (MDF) or Protected Area Decontamination Facility (PADF). For the purposes of this HASP, the MDF and the PADF will collectively be referred to as the Decontamination Facilities (DFs), unless requirements specific to either location necessitate further distinction.

#### 4.2 Activities

Procedures for accomplishing the activities covered by this HASP are contained in the EG&G Environmental Management Department (EMD) Operating Procedures Manual (OPM) Number 5-21000-OPS-FO, Volume I: Field Operations (FOs). EMD OPM Volume I has been reviewed and approved by the Colorado Department of Health and the U.S. Environmental Protection Agency. This HASP addresses activities described in specific sections of EMD OPM operating procedures as listed below. The listed FOs are incorporated in this HASP by reference.

Procedure No.	Title
FO.01	Air Monitoring and Dust Control
FO.03	General Equipment Decontamination
FO.04	Heavy Equipment Decontamination
FO.05	Handling of Purge and Development Water
FO.06	Handling of Personal Protective Equipment
FO.07	Handling of Decontamination Water and Waste Water

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

25 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

Procedure No.	Title
FO.10	Receiving, Labelling, and Handling Environmental Materials Containers
FO.11	Field Communications
FO.12	Decontamination Facility Operations
FO.13	Containerization, Preserving, Handling and Shipping of Soil and Water Samples
FO.15	Photoionization Detectors (PID) and Flame Ionization Detectors (FID)
FO.16	Field Radiological Measurements
FO.18	Environmental Sample Radioactivity Content Screening
FO.25	Shipment of Radioactive Materials Samples

### 4.3 Tasks

Individual tasks required to accomplish the activities specified in the operating procedures referenced above are listed below. Hazard assessments for the individual tasks are contained in Section 5 of this HASP.

- ▶ Operating and Maintaining Powered Equipment, utilizing the following equipment:
  - Portable 110 volt generator;
  - Air compressor;
  - High pressure wash;
  - Hand tools and power tools;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

26 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- Heavy equipment (forklift and skid steer) outfitted with a drum grapppler, snow plow and scoop;
- Transporting liquids and solids using a tanker truck and a cargo truck;
- Transporting drums using a cube van;
- Pressurized potable water; and,
- Pumping liquids and slurries from one location to another within the DF.
- ▶ Drum Handling, including the following activities:
  - Moving drums (filled and empty);
  - Opening drums to collect samples and remove accumulated water;
  - Moving drum pallets; and,
  - Inspecting drums positioned in a staging/transfer area.
- ▶ Sampling Liquid and Sediment Wastes Associated with Operation of the DF;
- ▶ DF Operation and Contractor Yard Maintenance, including the following activities:
  - Hanging and removing splash curtains until a permanent-wall unit is constructed;
  - Maintain flammable storage facility/cabinets;
  - Removing wet sediments from the DF pad floor slump;
  - Clean various surfaces with brushes and scrappers;
  - Climbing/walking on snow/ice covered surfaces (heavy equipment/inclined sides of berms/ladders);

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

27 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- Daily inspection of the decontamination facility, including the liquid waste management area, drum storage and decontamination pad area;
- Snow plowing and removal;
- Pumping sanitary waste (shower) water into disposal contractor's truck; and,
- Health and Safety Monitoring, consisting of radiological and volatile organic compound surveys of the decontamination facilities.

### 4.4 Work Site

As used in the context of this HASP, DF refers to a fixed Decontamination Facility that will generally include a concrete pad and a bermed area equipped with sumps, pumps, and pressurized sprays intended for use in decontaminating large items that could not conveniently be decontaminated in a relatively uncontrolled environment. A DF will also generally include a liquid waste management area enclosed by berms and a drum transfer/staging area for solid wastes. The Main Decontamination Facility (MDF) layout is depicted in Figure 4-1, and the Protected Area Decontamination Facility (PADF) is shown in Figure 4-2. A generalized process flow diagram for both facilities is provided in Figure 4-3.

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

28 of 119  
APR 15 1994

Effective Date:

Organization:

Environmental Management

## 5.0 HAZARD ASSESSMENT

### 5.1 Overview

A review of Rocky Flats Plant history, previous studies of the regional animal life and climate, results of previous site investigations, and the general industry-wide experience with using heavy equipment indicates that there are several sources of potential hazards to be assessed. The potential hazards have been placed into one of six classifications listed below.

- ▶ Encounters with native wildlife (including insects);
- ▶ Climatic conditions such as temperature extremes, thunder storms (lightning), and high winds;
- ▶ Physical injury when working with light and heavy equipment, handling drums, and operating vehicles;
- ▶ Electric shock;
- ▶ Exposure to radioisotopes such as plutonium, americium, and uranium in the surface water, groundwater, soils and sediments via absorption, injection, ingestion and inhalation. Appendix B provides information regarding the characteristics of radioisotopes that may be encountered. Appendix B includes Table B-1, which includes the maximum and minimum radioactivity concentration per isotope that has been reported at RFP; and,
- ▶ Exposure to nonradioactive potentially hazardous substances such as metals, anions, volatiles, and semivolatiles in surface water, groundwater, soils and sediments via absorption, injection, ingestion and inhalation. Appendix C contains Table C-1, which includes the maximum and minimum concentration of individual metals, anions, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) detected in groundwater, surface water, soils, and sediments at RFP.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

29 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Table 5-1 presents a list of compounds of concern (i.e., compounds which have been detected at least once in decontamination water samples collected between July and September of 1993). Table 5-1 will be updated with additional compounds as they are identified in decontamination water samples.

### 5.2 Methodologies Used to Complete the Hazard Assessments

The following is a brief summary of how hazard assessments were accomplished. Detailed information regarding how hazard assessments were accomplished is presented in various attachments as specified in the text below.

#### 5.2.1 Assessment Results and Methodology Employed to Assess Wildlife, Environmental Extremes, Physical Injuries and Electrical Shock When Working With Equipment

There is a certain likelihood for each of the potential hazard classifications listed in Subsection 5.1 above to become a true hazard. An estimate of the likelihood of such occurrences for all classification of potential hazards has not been conducted. The assessment of the first four classifications of potential hazard (encounters with native wildlife, environmental extremes, physical injuries and electrical shock) is subjective and indicates that they will exist at each work site, and, therefore, that steps must be taken to minimize the hazard. (See Section 6.0, General Health and Safety Requirements; Section 7.0, Site-Specific Health and Safety Requirements; and various standard operating procedure (SOPs) contained in Field Operations guidelines, as listed in Section 4.2 and included in this HASP by reference.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

30 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 5.2.2 Assessment Results and Methodology Employed to Assess Radioisotopes and Nonradioactive Potentially Hazardous Chemical Exposures

Assessments of the last two classifications of potential hazards (radioisotopes and nonradioactive potentially hazardous chemicals in various environmental medias) are presented by discussing the four potential routes of exposure. The routes of exposure discussed are absorption and injection (through the skin), ingestion, and inhalation.

#### 5.2.2.1 The Absorption, Injection, and Ingestion Routes of Exposure

A subjective manner of evaluation was used to assess the first three routes of exposure. The assessment indicates that these three routes of exposure will exist at each work site, and, therefore, that steps must be taken to minimize exposures by these routes. Methods of decreasing the likelihood of an exposure occurring via these routes are provided in Section 6.0, General Health and Safety Requirements; Section 7.0, Site-Specific Health and Safety Requirements; and various standard operating procedures (SOPs) contained in field operation (FO) guidelines.

#### 5.2.2.2 The Inhalation Route of Exposure

The potential for radioisotopes and nonradioactive metals in surface or groundwater to become airborne during the tasks listed in Section 4 (with the exception of using pressurized sprays) is very low. The potential for these compounds to become airborne has been calculated from Derived Air Concentration (DAC) guidelines set forth in DOE Order 5480.11, "Radiation Protection for Workers". The DAC equation is as follows:

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

31 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

$$\begin{aligned} \text{Maximum Expected Airborne Concentration} = \\ \text{Soil Concentration} \times \text{Mass Loading} \times 30. \end{aligned}$$

The predictions indicate that worker exposures greater than the applicable occupational exposure limit are very unlikely when working with surface or groundwater. However, prudent work practices, occupational exposure monitoring, and respiratory protection requirements to address potential exposures are established in Sections 6 and 7.

Worker exposures to material such as volatile and semivolatile organic compounds (VOCs and SVOCs) greater than the applicable occupational exposure limit are very unlikely when working with soils or sediments. However, prudent work practices, environmental monitoring and respiratory protection requirements to address potential exposures are established in Sections 6 and 7.

# DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	32 of 119
	Effective Date:	07/18/94
	Organization:	Environmental Management

---

## 6.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

### 6.1 Medical Surveillance

All persons assigned to work at the DF shall be active participants in a medical surveillance program equivalent to the requirements established by 29 CFR 1910.120. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, preferably an occupational physician. Each subcontractor shall submit a medical surveillance program to EG&G for approval prior to initiating work at the DF.

~~Radiation dosimeters and Radiological Bioassay Program will be furnished by EG&G and are required for all field workers.~~

### 6.2 Safety Training

Employees shall not participate in field activities until they have been trained to a level required by their job function and responsibility. Instructors shall have a level of training higher than and including the subject matter of the level of instruction which they are providing. All training and field experience shall be certified. Training requirements are discussed below.

#### 6.2.1 40-hour Basic Training

All field employees must have completed the 40-hour basic health and safety training required under 29 CFR 1910.120, and receive 8-hour annual refresher training thereafter.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

33 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.2.2 Three-Day On-Site Supervision

All field employees shall be required to receive a minimum of 3 days (24 hours) of on-site training in compliance with 29 CFR 1910.120 under the supervision of a trained and experienced supervisor. On-site time under supervision shall be documented using an EG&G-approved form. An example of the EG&G On-the-Job Training (OJT) form is provided in Appendix D.

### 6.2.3 Radiation Worker Training

All field employees shall be required to receive Radiation Worker Training as required by EG&G Radiological Engineering (RE).

### 6.2.4 On-Site Supervisor

The on-site supervisor (site manager) must have completed the basic 40-hour training course, 3 days of on-site supervision and at least 8 hours of specialized training in an OSHA-approved course on supervising hazardous waste operations.

### 6.2.5 Respirator Fit Testing

All employees required to perform tasks with Level C or Level B respiratory protection requirements (See Section 7.5) shall be appropriately fit tested and trained in the use of air-purifying respirators (Level C) and self contained breathing apparatus (SCBA) (Level B), as appropriate. Training shall be incorporated in the subcontractor's Respiratory Protection Program, and approved by EG&G prior to implementation.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

34 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.2.6 Health & Safety Specialist (HSS)

The Health and Safety Specialist must have completed the 40-hour training, 3-day on-site supervision, and 3-day Radiation Worker Training. The HSS will be approved by EG&G Radiological Engineering and Industrial Hygiene representatives after demonstration of proficiency at HSS tasks as described in an approved Health and Safety Specialist-in-Training (HSST) program. The HSS shall also possess current certificates of training in adult CPR and the Standard American Red Cross First Aid.

### 6.2.7 Operators of Powered Drum-Handling Equipment

Only trained and authorized operators shall be permitted to operate powered drum handling equipment. A trained operator will possess a certificate of training and may conduct training of others. Personnel in training may operate powered drum-handling equipment under the supervision of a trained operator. A listing of authorized operators will be maintained.

### 6.2.8 Site-Specific Safety Orientation Meeting

Each contractor, subcontractor, and EG&G employee will receive a site-specific safety orientation prior to commencement of activities at a decontamination facility. The following topics will be discussed at this meeting:

- ▶ Names of health and safety personnel and alternates responsible for site health and safety;
- ▶ Health and safety organization;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

35 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

- ▶ Hazards at the site;
- ▶ Electrocutation;
- ▶ Exposure risk;
- ▶ Personal protective equipment to be used;
- ▶ Personnel and equipment decontamination procedures;
- ▶ Air monitoring;
- ▶ Emergency procedures/contingency plans;
- ▶ Buddy systems; and,
- ▶ Training requirements to perform specific tasks.

A copy of this HASP will be available to all field personnel. At the end of the meeting, attendees should be informally quizzed to assess their understanding of the health and safety requirements, and should sign a safety compliance agreement form stating that they have read, understand, and agree to comply with the provisions of the plan. Anyone refusing to sign the form will be prohibited from working at the site.

If a new employee who has not gone through the site-specific safety orientation meeting is assigned to the site, the HSS must present a similar briefing to the new employee before he or she participates in any field activities. All new employees must sign the safety compliance agreement form before beginning work at the DF. A copy of the signed safety compliance agreement will be provided to the DF HSS prior to beginning work at the DF.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

36 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.2.9 Periodic Safety Meetings

Daily "tailgate" briefings are desirable but, as a minimum, weekly health and safety briefings will be conducted. Additional health and safety briefings will be conducted when the site manager and the HSS agree that a given topic warrants immediate attention.

### 6.2.10 Lifting

When lifting or carrying items is part of the job, it is each individual's responsibility to use the following guidelines:

- ▶ Make sure there are no nails or other items protruding which may cause injury in the lifting and carrying procedure;
- ▶ Utilize a lifting belt when lifting heavy objects;
- ▶ Do not attempt to lift more than 50 pounds without assistance. Items weighing more than 50 pounds should be lifted by two people, or with a forklift or handtruck;
- ▶ When lifting, crouch as close to the object as practical, get a good grip on it, and keep feet apart, bending at the knees;
- ▶ Lift slowly by straightening legs;
- ▶ Keep back relatively straight when lifting; and,
- ▶ Use leg muscles, not back muscles.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

37 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.2.11 DF-Specific Training

As/if additional DFs are brought into service, additional training may be warranted due to the use of new or different equipment. The Site Manager and the HSS will identify training needs to the Project Manager, Health and Safety Officer, and the EG&G Project Manager.

### 6.3 Visitor Clearances

All visitors to the site must be cleared by RFP security personnel.

### 6.4 Buddy System

The "buddy system" and radio communications will be used during all activities at the DF. Particular emphasis is placed on the importance of the buddy system when conducting any activities requiring Level C or Level B respiratory protection.

### 6.5 Work Zones

Three work zones will be established around a decontamination activity: the exclusion zone (EZ), the contamination reduction zone (CRZ), and the support zone. Environmental Radiological Guidance (EMRG) 1.3, Section 5.1.1 will be consulted for posting requirements applicable to areas and equipment potentially contaminated with radioactive materials.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

38 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.5.1 Exclusion Zone

The exclusion zone is an area where contaminants could or do occur. The equipment decontamination pad shall be considered an exclusion zone (EZ) when decontamination activities are being conducted. The outer boundary of the EZ will serve as a hot line and the curtains will serve as the boundary. The liquid waste management area will be considered an EZ when work is being accomplished in that area. Access control points will be established at the periphery of the EZ to regulate and control the flow of personnel and equipment into and out of the zone and to help verify that proper procedures for entering and exiting are followed.

A radiologically controlled area (RCA) will be established at the decontamination pad when decontamination of a radiologically-contaminated item is needed. The HSS will be notified and will ensure the following actions are taken when decontaminating radiologically-contaminated items:

- ▶ Identify the area that the contaminated equipment is coming from;
- ▶ Determine the contamination level;
- ▶ A radiological work permit will be prepared and RFP Radiological Engineering will be contacted;
- ▶ The decontamination pad will be closed off with yellow and magenta tape or rope. Post area as a RCA with appropriate entrance and exit signs;
- ▶ A step-off pad will be established;
- ▶ The item will be sealed and transported per Field Operating Procedure F.O.4, Section 6.4;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

39 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- ▶ Remove material used to seal the contaminated area while wearing level of personal protective equipment specified in the radiological work permit;
- ▶ Decontaminate item;
- ▶ Monitor personnel for contamination, in accordance with EMRG 2.1, and decontaminate as necessary, in accordance with EMRG 2.3;
- ▶ Survey contaminated area to verify decontamination;
- ▶ Survey decontamination pad to verify decontamination;
- ▶ HSS will complete depositing forms for the RCA; and,
- ▶ Depost the area after proper notification.

### 6.5.2 Contamination Reduction Zone (CRZ)

In general, the CRZ is established immediately outside the exclusion zone to minimize the migration of contaminants from the exclusion zone to clean or support areas and to reduce the exposure potential of individuals leaving the exclusion zone. Personnel decontamination will require establishing a step-off pad. Minimum step-off pad requirements differ for radiologically-controlled areas (RCAs) and non-RCAs.

Specific personnel decontamination procedures for radiological contamination are outlined in EMRG 2.1 and 2.3. Minimum requirements for a step-off pad such as is required at each radiologically controlled area (RCA) are listed below:

- ▶ Place a sign with the proper warnings/notices so that persons cannot enter the RCA without observing the sign. Procedures for exiting the RCA will be posted on the rear of the sign for review by persons exiting the RCA;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

40 of 119

Effective Date:

APR 13 1994

Organization:

Environmental Management

---

- ▶ Lay visqueen or other heavy gauge plastic sheeting on the ground so that a few feet of it extends into the RCA;
- ▶ Set up a table beside the visqueen so that half of the table is in the RCA and the other half is outside of the RCA;
- ▶ Position two personal protective equipment (PPE) containers with plastic liners beside the table. One PPE container will be labeled "Contaminated PPE" and the other PPE container will be labeled "Uncontaminated PPE";
- ▶ Cover the table top with visqueen or other heavy gauge plastic sheeting. Draw a line across the table top to indicate where the RCA boundary crosses the table. That half of the table inside the RCA will be used to place equipment that is to be screened for contamination. Equipment that has been screened and found free of contamination will be placed on the half of the table that is outside of the RCA. Equipment that has been screened and found to be contaminated will be examined for the presence of removable contamination. If contamination is removable, the equipment will be re-decontaminated and re-monitored. If the contamination is not removable, the equipment will be disposed of as radioactive waste and EG&G Radiological Engineer will be notified to take appropriate action;
- ▶ The individual responsible for screening personnel as they depart the RCA will wear gloves and stand on the visqueen immediately outside of the RCA but near enough to the RCA boundary to conduct personnel screening activities;
- ▶ PPE found to be contaminated with radioactive materials will be placed inside the "Contaminated PPE" container. Other PPE items will be placed in the "Uncontaminated PPE" container;
- ▶ If radiological contamination is found, the PPE will be removed and the next layer of PPE monitored. That process will continue until contamination is no longer found. If skin contamination is found, the HSS will notify EG&G Radiological Engineering and Occupational Health and provide steps necessary to remove that contamination; and,

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

41 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

- ▶ Respiratory protection will be the second to last PPE item monitored and removed if it was worn during the course of work within an RCA. Inner gloves will be the last PPE item removed.

### *Non-RCA Step-off Pad Requirements*

In general, a minimum step-off pad requirements for non-RCAs include:

- ▶ Place a sign restricting access to the CRZ to authorized personnel only;
- ▶ Position a personal protective equipment (PPE) container with a plastic liner in the CRZ and label the container "Uncontaminated PPE";
- ▶ Wash and rinse boots upon exiting the CRZ; and,
- ▶ Remove PPE, if worn, in the appropriate sequence. Respiratory protection, if worn, will be the second to last PPE item removed. Inner gloves will be the last item removed.

Additional requirements may be dictated by task-specific requirements. The HSS will determine additional appropriate requirements based on hazards associated with the task and PPE worn while conducting the activity.

### 6.5.3 Support Zone

The support zone is located in a clean area, preferably upwind and immediately outside of the CRZ, or in the on-site vehicles. Supplies, emergency equipment, and support personnel are located in the support zone or in the on-site vehicles.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

42 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.6 Field Activities

#### 6.6.1 Personal Requirements/Prohibitions

- ▶ All new personnel and subcontractors not routinely working in the buffer zone will log into the buffer zone at the Environmental Operations Management trailer (T891E) and will carry radios for communication while in the field;
- ▶ Obey buffer zone rules;
- ▶ No running or horseplay;
- ▶ The required level of personal protective equipment must be worn by all on-site personnel;
- ▶ Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the exclusion zone and the CRZ. Drinking of water, Gatorade™, or equivalent fluids may occur in the CRZ at the discretion of the HSS;
- ▶ Smoking is prohibited at the Decontamination Facility and in the Buffer Zone;
- ▶ No jewelry may be worn by personnel engaged in field work, except for watches, which will be disposed if they become contaminated;
- ▶ No facial hair which interferes with a satisfactory fit of the mask-to-face seal is allowed on personnel required to wear respirators;
- ▶ Medicine and alcohol can increase the effects from exposure to toxic chemicals. Personnel taking prescription drugs are required to notify EG&G Occupational Health and Safety, and the SSO. Alcoholic beverage intake will not be allowed on RFP plant site;
- ▶ Any person who has a medical condition or allergy that could render them unconscious or result in a life-threatening situation will notify the Site Manager

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

43 of 119  
APR 15 1994

Effective Date:

Organization:

Environmental Management

---

and the HSS and provide the appropriate response actions before beginning field work;

- ▶ Safety devices on equipment must be left intact and used as designed;
- ▶ Equipment and tools will be kept clean and in good repair and used only for their intended purpose. Operations and Maintenance manuals for equipment used during decontamination facility operations are provided in the operations and maintenance manual;
- ▶ ANSI-approved safety glasses with side shields shall be worn in the exclusion zone and contamination reduction zone; and,
- ▶ Leather gloves must be worn when handling empty or closed drums.

### 6.6.2 Contamination/Exposure Prevention

On-site personnel may become contaminated by:

- ▶ Being splashed by contaminated liquids while sampling or handling liquids;
- ▶ Coming in contact with contaminated solids or liquids;
- ▶ Walking through contaminated materials, either in solid or liquid state;
- ▶ Being in contact with contaminated equipment;
- ▶ Being in contact with contaminated solid substances in waste piles or on the soil surface;
- ▶ Sitting or kneeling on the ground; and,
- ▶ Inhalation.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

44 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

On-site team members will avoid, as much as possible, becoming contaminated. This will be accomplished by safe work practices as required by relevant FOs and by wearing the appropriate Personnel Protection Equipment (PPE). The reader is instructed to refer to Section 7.5 for specific PPE requirements for each task.

On-site personnel will avoid exposure to hazardous chemicals by strictly adhering to the required personal protection equipment and decontamination procedures.

Care will be taken to prevent equipment contamination as much as possible. Sampling and monitoring equipment will not be laid on contaminated surfaces. When decontaminating known radiologically-contaminated equipment, the equipment will be bagged, and the bag taped and secured around the instrument. Openings will be made in the bag for sample intake and exhaust ports.

Surfaces will be considered radiologically contaminated if release limits for unrestricted use are exceeded. Release limits for unrestricted use are established in EG&G EMRG 3.02.

### 6.6.3 Heavy Equipment Operation

For the purposes of this health and safety plan, the term "industrial truck" includes fork lifts and skid steers. All operators must be certified (see Subsection 6.2.6) and documentation of certification will be provided to the DF HSS.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

45 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.6.3.1 General Requirements

The following requirements warrant extra attention when working around industrial trucks specifically and heavy equipment in general:

- ▶ A valid drivers license is required to operate any motorized vehicle;
- ▶ Wear hard hats (unless you are within a roll cage) and steel-toed boots;
- ▶ Pay attention at all times;
- ▶ Ground personnel should maintain visual contact with the equipment operators at all times;
- ▶ Establish hand signal communication when verbal communication is difficult. Determine one person per work group to give hand signals to equipment operators;
- ▶ All heavy equipment shall have backup alarms as specified by 29 CFR 1926.601;
- ▶ Only qualified persons are to operate heavy equipment;
- ▶ Never walk directly in back of or to the side of heavy equipment without the operator's knowledge;
- ▶ Never use a motorized vehicle unless you are certified/licensed. This applies to heavy as well as light motorized equipment;
- ▶ Fuel tanks will not be filled while the engine is running;
- ▶ No equipment will be operated with a leak in the fuel system;
- ▶ Hearing protection will be provided if work site levels exceed the levels specified by OSHA, or if requested by an employee. The rule of thumb is that if you have to shout to be heard, hearing protection should be used;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

46 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

- ▶ Be sure that underground or overhead power lines, sewer lines, gas lines and telephone lines have been identified and will not present a hazard in the work area;
- ▶ Heavy equipment shall not be altered so that the relative positions of the various parts are different from what they were when originally manufactured;
- ▶ Excluding a manufacturer-approved special attachment to the skid steer used to remove sediments from the decontamination pad floor sump, heavy equipment, shall not be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts;
- ▶ Additional counterweighting of forklifts shall not be done;
- ▶ Ensure that air bottles when used are secured properly to heavy immobile equipment;
- ▶ Motorized equipment will be inspected daily by a trained, authorized operator (Subsection 6.2.6) and a record of the inspection will be maintained;
- ▶ Tow straps, chains, cables, ropes, and any other type of nonrigid connecting link will not be used for moving equipment from one location to another. Equipment to be towed will be firmly and securely attached to the tow vehicle by means of a suitable drawbar supplemented by a safety chain (or chains) or safety cables. The method of towing selected must ensure that the towed vehicle will follow substantially in the path of the towing vehicle and will not whip or swerve dangerously from side to side; and,
- ▶ Personnel are not to be under any object supported only by hydraulics due to the potential for hydraulic failure.

94-DNR-ERM-0061

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

47 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.6.3.2 Operations

The equipment shall be operated in a safe manner which will minimize risk to the operator and co-workers. The following requirements will be observed at all times.

- ▶ Trucks shall not be driven up to anyone standing in front of a bench or other fixed object;
- ▶ No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty;
- ▶ Personnel shall not be permitted to ride on powered industrial trucks unless the truck was designed to carry passengers;
- ▶ Arms and/or legs will not be placed between the uprights of the mast or outside the running lines of the trucks;
- ▶ When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.
  - A powered industrial truck is unattended when the operator is 25 feet or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view; and,
  - When the operator of an industrial truck is dismounted and within 25 feet of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.
- ▶ A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock or platform. Trucks shall not be used for opening or closing freight doors;
- ▶ Brakes shall be set and wheel blocks shall be in place to prevent movement of trucks or trailers while loading or unloading industrial trucks. Fixed jacks may be necessary to support a semitrailer during loading or unloading when the trailer

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

48 of 119

Effective Date:

APR 17 1994

Organization:

Environmental Management

---

is not coupled to a tractor. The flooring of trucks and trailers shall be checked for breaks and weakness before they are driven onto;

- ▶ There shall be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc;
- ▶ An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load;
- ▶ A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling rearward;
- ▶ Whenever a truck is equipped with vertical only, or vertical and horizontal controls elevatable with the lifting carriage or forks for lifting personnel, the following additional precautions shall be taken for the protection of personnel being elevated:
  - Use of a safety platform firmly secured to the lifting carriage and/or forks;
  - Means shall be provided whereby personnel on the platform can shut off power to the truck;
  - Such protection from falling objects as indicated necessary by the operating conditions shall be provided; and,
  - Fire aisles, access to stairways, and fire equipment shall be kept clear.
- ▶ A hard hat shall be worn by the forklift operator if objects will be lifted more than 72 inches (6 feet).

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

49 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.6.3.3 Traveling

All traffic regulations shall be observed. The following requirements will be observed at all times:

- ▶ Authorized plant speeds will not be exceeded;
- ▶ A safe distance shall be maintained (approximately three truck lengths) from the vehicle ahead, and the truck shall be kept under control at all times;
- ▶ The right of way shall be yielded to ambulances, fire trucks, or other vehicles in emergency situations;
- ▶ Other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations shall not be passed;
- ▶ The driver shall be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing;
- ▶ Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited;
- ▶ The driver shall be required to look in the direction of and keep a clear view of the path of travel;
- ▶ Grades shall be ascended or descended slowly;
- ▶ When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade;
- ▶ On all grades, the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface;
- ▶ Under all travel conditions, the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

50 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

- ▶ Stunt driving and horseplay shall not be permitted;
- ▶ The driver shall slow down for wet and slippery floors;
- ▶ Dockboards or bridgeplates shall be properly secured before they are driven over. Dockboards or bridgeplates shall be driven over carefully and slowly and their rated capacity never exceeded;
- ▶ Running over loose objects on the roadway surface shall be avoided; and,
- ▶ While negotiating turns, speed shall be reduced to a safe level and the hand steering wheel will be turned in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

### 6.6.3.4 Loading

Only stable and safely arranged loads will be handled. The following requirements will be observed at all times.

- ▶ Only loads within the rated capacity of the truck shall be handled;
- ▶ Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load;
- ▶ A load engaging means shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load; and,
- ▶ Extreme care shall be used when tilting the load forward or backward; tilting forward with load engaging means elevated shall be prohibited except to pick up a load.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

51 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.6.4 Heavy Materials Handling Safety

The following are guidelines to follow when working with heavy materials:

- ▶ Be aware of footing at all times;
- ▶ Use chains, hoists, straps, and any other equipment to safely aid in the moving or lifting of heavy objects/materials;
- ▶ Use your legs, not your back;
- ▶ Get help whenever a material's weight is anticipated to exceed 50 pounds; and,
- ▶ Wear a lifting belt when lifting heavy objects.

### 6.6.5 Drum Handling

Drum handling presents numerous serious physical and chemical hazards. Physical hazards include back injury, crushing, bruising, laceration, and severe trauma. Drum contents may present a fire or explosion hazard, they may be pressurized, corrosive, or toxic. Adequate drum handling procedures are essential to worker well-being and the successful accomplishment of field operations.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

52 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.6.5.1 General Requirements

Drums containing environmental wastes will be handled as detailed below.

- ▶ All drums will be radiologically surveyed per EMRG 3.02;
- ▶ Filled or partially filled drums must be moved by powered equipment designed to carry drums. Filled and partially filled drums will not be rolled on edge or moved by hand;
- ▶ Drums and containers used during clean-up of environmental wastes shall meet the appropriate DOT, OSHA, and EPA regulations for the wastes they contain;
- ▶ Drums and containers shall be inspected and their integrity shall be assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., stacked behind other drums, etc.) shall be moved a minimum distance to an accessible location and inspected prior to further handling;
- ▶ Unlabelled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are characterized with field instruments capable of detecting organic vapors and radioactivity. The drums will be labelled and handled based upon the results of the field characterization until more definitive analysis results are available;
- ▶ Site operations shall be organized to minimize the amount of drum or container movement;
- ▶ Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers;
- ▶ U.S. Department of Transportation-specified (or equivalent) salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

53 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- ▶ If spillage from a drum occurs, the emergency procedures established in Section 8 will be followed;
- ▶ Drums and containers that cannot be moved without rupture, leakage, or spillage shall be overpacked under the supervision of the EG&G Environmental Manager;
- ▶ Overpacking or repacking drums requires an Integrated Work Control Package (IWCP) approved procedure;
- ▶ Although not anticipated as likely to be present, drums and containers under pressure, as evidenced by bulging or swelling, and drums that show crystalline material on the outside shall not be moved until such time as the cause for excess pressure/crystalline material is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum;
- ▶ Fire extinguishing equipment suitable for use against Class A, B, and C fires shall be located within 50 feet from any drum handling, opening or sampling operations; and,
- ▶ Drums that contain absorbent material for spill response should be labeled appropriately and inventoried.

### 6.6.5.2 Opening and Sampling Drums

The following procedures and those in EMD Operating Procedure FO.13, Containerization, Handling, and Shipping of Soil and Water Samples, shall be followed in areas where drums or other containers of environmental waste are being opened.

- ▶ Drums of hazardous or potentially hazardous environmental wastes will be opened inside an exclusion zone;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

54 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- ▶ Although not anticipated during work at the DF, if an airline respirator system is used, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage;
- ▶ Employees not actually involved in opening drums or containers shall be kept a safe distance from the drums or containers being opened;
- ▶ If employees must work near or adjacent to drums or containers under pressure and being opened, a suitable shield that does not interfere with the work operation shall be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion;
- ▶ Material handling equipment and hand tools shall be of the type to prevent sources of ignition;
- ▶ Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved. If pressure cannot be relieved from a remote location, appropriate shielding shall be placed between the employee and the drums or containers to reduce the risk of employee injury; and,
- ▶ Employees shall not stand upon or work from drums or containers.

### 6.6.6 Housekeeping

Housekeeping is an important aspect of an investigation program and will be strongly stressed in all aspects of field work. Good housekeeping plays a key role in occupational health protection and is a way of preventing dispersion of dangerous contaminants. All work areas will be kept as clean as possible at all times, and spills will be cleaned up immediately. Housekeeping will be the responsibility of all employees.

Subcontractors will implement a housekeeping program for the field activities to minimize the spread of contamination beyond the work site. The program will include:

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

55 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

- ▶ Daily scheduling to police the area of debris including paper products, cans, and other materials brought on site;
- ▶ Daily changing of wash and rinse water for hands, face, and equipment; and,
- ▶ Periodic (daily minimum) removal of all garbage bags and containers used to dispose of food products, plastic inner gloves, and contaminated disposable clothing.

### 6.7 Personal Protective Equipment (PPE)

It is expected that there will be a tailoring of requirements for specific sites and seasonal variations. Changes to PPE requirements established in this health and safety plan shall be agreed upon by the Site Manager, the HSS, and appropriate EG&G personnel (ERM HSO, HS Liaison Officer, PM, RE, and IH). A Field Change Form will be created, dated, and signed by the Site Manager and HSS. The HSS shall post PPE requirements in the crew trailer and announce changes and justification for those changes at a site safety meeting and provide a copy of the PPE changes to a senior health and safety representative responsible for developing the health and safety plan. The responsible senior health and safety representative will publish a change to this plan if PPE changes are permanent and if the changes are considered substantive. The intent of PPE requirements for tasks described in Section 7.0 is to limit exposures to levels as low as reasonably achievable (ALARA). In no case shall PPE changes increase the risk of exposure above ALARA levels. Any downgrading of PPE ensembles requires RE approval.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

56 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.7.1 Clothing

Personal protective equipment should be inspected before use. The following checks should be made before use:

- ▶ Determine that the clothing material is correct for the specific task at hand;
- ▶ Visually inspect for:
  - Imperfect seams;
  - Tears; and,
  - Malfunctioning closures.
- ▶ Hold up to light and check for pinholes.

During the work task, periodically inspect for the following:

- ▶ Evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects;
- ▶ Closure failure;
- ▶ Tears;
- ▶ Punctures; and,
- ▶ Seam discontinuities.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

57 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.7.2 Steel-toed Boots, Safety Glasses, and Hard Hats

Steel-toed protective boots, and safety glasses with side shields, will be worn by all field workers. Hard hats will be worn if overhead hazards exist.

### 6.8 Emergency Equipment

The following emergency equipment will be readily available at the Decontamination Facility and in the cargo van:

- ▶ First aid kit;
- ▶ Eye wash capable of a 15-minute rinse;
- ▶ Potable water;
- ▶ Fire extinguisher (10-lb ABC);
- ▶ An extra full set of the appropriate PPE for each team member; and,
- ▶ Spill kit for up to 55 gallons of sediment.

### 6.9 Temperature Stress

Temperature stress can be induced by both hot and cold environmental conditions.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

58 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.9.1 Heat Stress

A Wet Bulb Globe Temperature (WBGT) Instrument will be used to monitor employee exposure to heat stress condition, with the action level and work rest regimen being based on the latest published values by the American Conference of Governmental Industrial Hygienists. Monitoring will begin at 70 degrees Fahrenheit for heat stress. As many of the following control measures as are appropriate to site conditions shall be utilized to aid in controlling heat stress:

- ▶ Provide adequate liquids to replace lost body fluids and replace water and salt lost from sweating. Encourage personnel to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement;
- ▶ Replace fluids with water, commercial electrolyte replacement mixes such as Gatorade™ or Quick Kick™, or a combination of these;
- ▶ Establish a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers;
- ▶ Wear cooling devices such as vortex tubes or cooling vests beneath protective garments;
- ▶ Take all breaks in a cool rest area (approximately 77 degrees Fahrenheit);
- ▶ Remove impermeable protective garments during rest periods;
- ▶ Do not assign other tasks to personnel during rest periods; and,
- ▶ Inform personnel of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

59 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.9.2 Heat Stress Monitoring

Table 6-1 describes the signs and symptoms of heat stress. Personnel should be alert for the signs and symptoms of heat stress.

Since measurement of deep body temperature is impractical for monitoring the employees' heat load, the measurement of ambient air temperature is required. At the present time, Wet Bulb Globe Temperature Index (WBGT) is the simplest and most suitable technique to measure the environmental factors. WBGT values are calculated by the following equations:

► Outdoors with solar load:

$$WBGT = 0.7 NWB + 0.2 GT + 0.1 DB$$

► Indoors or outdoors with no solar load:

$$WBGT = 0.7 NWB + 0.3 GT$$

where:

WBGT	=	Wet Bulb Globe Temperature Index
NWB	=	Natural Wet-Bulb Temperature
DB	=	Dry-Bulb Temperature
GT	=	Globe Temperature

Permissible Heat Exposure Limits, adapted from ACGIH 1993-1994 TLVS, are provided in Table 6-2.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

60 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.9.3 Cold Stress

Fatal exposure to cold among workers has almost always resulted from accidental exposures involving failure to escape from low air temperatures or immersion in low temperature water. The single most important aspect of life-threatening hypothermia is the fall in deep core temperature of the body. Employees should be protected from exposure to cold so that the deep core temperature does not fall below 97 degrees Fahrenheit (36 °C); lower body temperature will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of death. Adequate dry clothing must be provided to workers if work is to be performed in air temperatures below 40°F (4°C).

### 6.9.4 Cold Stress Monitoring

For exposed skin, continuous exposure should not be permitted when the air speed and temperature results in an equivalent chill temperature of 40 degrees Fahrenheit (4 °C). At temperatures of 36 degrees Fahrenheit (2° C) or less, it is imperative that employees who become immersed in water or whose clothing becomes wet be immediately provided with a change of clothing and be treated for hypothermia. Special protection of the hands is required to maintain manual dexterity for the prevention of accidents.

- ▶ Work Below 40 Degrees Fahrenheit (4 °C) (including wind chill). Provisions for additional total body protection is required if work is performed at or below 4 degrees Celsius as follows:

- The employees shall wear cold protective clothing appropriate for the level of cold and physical activity;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

61 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- If the air velocity at the site is increased by wind or artificial ventilation, the cooling effect of the wind shall be reduced by wearing a removable outer windbreak garment;
  - If the clothing on the employee may become wet on the job site, the outer layer of the clothing in use should be water repellent;
  - If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work shall be modified or suspended until adequate clothing is made available or until weather conditions improve; and,
  - Employees handling evaporative liquids at temperatures below 4 degrees Celsius shall take special precautions to avoid soaking of clothing or gloves due to the added danger of cold injury due to the evaporative cooling.
- Work Below 10 Degrees Fahrenheit (-12 °C)(including wind chill). For work practices at or below -12 degrees Celsius, the following shall apply:
- The worker shall be under constant protective observation (buddy system);
  - If work must be done, rest periods must be taken in heated shelters and opportunity for changing into dry clothing shall be provided;
  - New employees shall not be required to work full-time in cold the first few days until they become accustomed to the working conditions and required protective clothing;
  - The work shall be arranged in such a way that sitting still or standing still for long periods is minimized; and,
  - The workers shall be instructed in health and safety procedures.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

62 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 6.9.5 Training

The training program shall include as a minimum, instruction in:

- ▶ Proper rewarming procedures and appropriate first aid treatment;
- ▶ Proper clothing practices;
- ▶ Proper eating and drinking habits;
- ▶ Recognition of impending frostbite;
- ▶ Recognition signs and symptoms of hypothermia or excessive cooling of the body even when shivering does not occur; and,
- ▶ Safe work practices.

### 6.10 Work During Darkness

This health and safety plan does not cover field work after daylight hours. Accordingly, no field work shall be conducted during darkness.

### 6.11 Confined Space Work

No work in confined spaces or places with limited egress is permitted by this plan.

According to the proposed regulations from OSHA on confined spaces (29 CFR 1910.146), a "permit required" confined space is an enclosed space which:

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

63 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

- ▶ Is large enough and so configured that an employee can bodily enter and perform assigned work;
- ▶ Has limited or restricted means for entry and exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, pits, and diked areas);
- ▶ Is not designed for continuous employee occupancy; and,
- ▶ Has one or more of the following characteristics:
  - Contains or has a known potential to contain a hazardous atmosphere;
  - Contains a material with the potential for engulfment of an entrant;
  - Has an internal configuration such that an entrant could be trapped or asphyxiated by inward converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or,
  - Contains any other recognized serious safety and health hazard.

No confined spaces have been identified as work areas under this HASP. If additional sites are added, they will have to be evaluated for confined space entry requirements.

### 6.12 Thunderstorms and Tornadoes

Meteorological conditions shall be closely watched, especially in the spring, when severe thunderstorms, lightning, and tornadoes are most likely to occur. Thunderstorms, lightning and tornadoes often occur late in the afternoon on hot spring days, but can occur at any time of the day in any season of the year. Tornadoes are usually preceded by severe thunderstorms with frequent lightning, heavy rains, and strong winds.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

64 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

A severe thunderstorm watch or a tornado watch announcement on the radio indicates that a severe thunderstorm or tornado is possible. Normally, work will continue at the work site during severe thunderstorm watches or tornado watches. A severe thunderstorm warning or a tornado warning signifies that a severe thunderstorm or a tornado has been sighted or detected by radar and may be approaching. Normally work on site shall cease during a severe thunderstorm warning, or tornado warning. Decisions to cease work will be made after consultation between the HSS and the site manager. Emergency actions to be taken during a tornado are provided in Section 8. High wind warning levels, alarms, and responses are described in FO.01, "Air Monitoring and Dust Control", incorporated in this document by reference.

### 6.13 Hand Tools and Portable Power Tools

Hand tools are non-powered. They include anything from axes to wrenches. The greatest hazards posed by hand tools result from misuse and improper maintenance. Power tools can be hazardous when improperly used. There are several types of power tools, utilizing various power sources: electric, pneumatic, liquid fuel, or hydraulic.

#### 6.13.1 General Requirements

- ▶ External hazardous moving parts must be covered/guarded. Safety guards will not be removed when a tool is being used.;
- ▶ Keep all tools in good condition with regular maintenance;
- ▶ Use the right tool for the job;
- ▶ Examine each tool for damage before use;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

65 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- ▶ Operate according to the manufacturer's instructions;
- ▶ Provide and use the right protective equipment, such as gloves and eye protection;
- ▶ Compressed air will not be used for cleaning purposes except where reduced to less than 30 pounds per square inch (p.s.i.) and then only with effective personal protective equipment;
- ▶ The use of compressed air for blowing dirt from hands, face, or clothing is prohibited; and,
- ▶ Liquid-fueled tools will be shut off and allowed to cool before fuel is added.

### 6.13.2 Hand Tool Requirements

- ▶ All hand tools shall be in good repair and used only for the purpose for which designed;
- ▶ Tools having defects that will impair their strength or render them unsafe shall be removed from service;
- ▶ When work is being performed overhead, tools not in use shall be secured or placed in holders;
- ▶ Throwing tools or materials from one location to another, from one person to another, or dropping them to lower levels, shall not be permitted;
- ▶ Only nonsparking tools shall be used in locations where sources of ignition may cause a fire or explosion; and,
- ▶ Tools requiring heat treating shall be tempered, formed, dressed, and sharpened by personnel who are experienced in these operations.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

66 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 6.13.3 Power Tool Requirements

- ▶ Power tools shall be inspected, tested, and determined to be in safe operating condition prior to use. Continued periodic inspections shall be made to assure safe operating condition and proper maintenance;
- ▶ Rotating or reciprocating portable power tools shall have a constant pressure switch that will shut off the power when the tool is released by the operator. A portable power tool may have a lock-on control provided turn-off can be accomplished by a single motion of the same finger or fingers that turned it on;
- ▶ Loose and frayed clothing, loose long hair, dangling jewelry, rings, chains, and wrist watches shall not be worn while working with any power tool or machine;
- ▶ Never carry a tool by the cord or hose;
- ▶ Never yank the cord or the hose to disconnect it from the receptacle;
- ▶ Keep cords and hoses away from heat, oil, and sharp edges;
- ▶ Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters;
- ▶ All observers should be kept at a safe distance away from the work area;
- ▶ Secure work with clamps or a vise, freeing both hands to operate the tool;
- ▶ Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool;
- ▶ Tools should be maintained with care. They should be kept sharp and clean for the best performance. Follow instructions in the user's manual for lubricating and changing accessories;
- ▶ Be sure to keep good footing and maintain good balance;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

67 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- ▶ The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts;
- ▶ All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use";
- ▶ Electric tools must either have a three-wire cord with ground and be grounded or be double insulated. And, each electric tool used at the DF will have a ground-fault circuit interrupter placed in line between the tool and the power source; and,
- ▶ The pressurized steam cleaner shall be inspected prior to use for evidence of loose or frayed electrical connections, corroded or leaking water connections, and fuel or oil leakage. The cleaner will not be used if any of these conditions exist; the conditions will be corrected prior to use. Care shall be taken when operating the steam cleaner, with special attention paid to hazards presented by high pressure and temperature. Operators shall be aware of burn and cut potentials associated with steam cleaner operation. Under no circumstances will the wand be pointed at any body part. Operators will be especially careful to avoid contacting extremities with the wash stream.

### 6.14 Electrical Safety

The use of electrical energy always entails a potential for electrical shock. The use of electrical energy in a damp/moist environment such as the decontamination facility results in an increased potential for electrical shock. The following requirements will be implemented.

- ▶ All electrical wiring and equipment shall be a type listed by the underwriters laboratory (UL) or Factory Mutual Engineering Corporation (FM);
- ▶ Electrical wire or flexible cord passing through work areas shall be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

68 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

- ▶ Attachment plugs shall be constructed so that they will endure rough use and be equipped with a cord grip to prevent strain on the terminal screws;
- ▶ Flexible cord shall be used only in continuous lengths. Splicing of flexible cords is not permitted;
- ▶ Patched, oil soaked, worn or frayed electrical cords shall not be used;
- ▶ Electrical cords will not be fastened with staples, hung from nails, or suspended by bare wire;
- ▶ Plugs and receptacles shall be of an approved submersible type;
- ▶ Ground fault circuit interrupters (GFCIs) are required in all circuits used for portable tools. GFCIs shall be trip tested before use (each day of use) by pressing the test button. If a test button is not present, the manufacturer instructions for testing will be followed;
- ▶ A ground strap will be used between the frame of portable generators and a grounding rod. Grounding rods must be 5/8 inch diameter steel or iron rods, 1/2 inch diameter copper clad steel, or 3/4 in diameter galvanized pipe. They shall be in unbroken 8 foot lengths and driven to full depth;
- ▶ Grounding clamps/clips shall be attached before circuits are energized. A secure and positive metal-to-metal contact shall be made. Grounding clamps/clips shall not be removed until the circuits are de-energized;
- ▶ Weather-proof wiring shall be used. Receptacles shall be contained in a weather-proof enclosure the integrity of which is not affected when an attachment plug is inserted;
- ▶ Wiring shall be hard usage or extra hard usage. Approved cords may be identified by the word "outdoor" or letters "WA" on the jacket; and,
- ▶ Flexible cards shall be connected to devices and fittings so that strain relief is provided which will prevent pull from being transmitted to joints or terminal screws.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

69 of 119

Effective Date:

Organization:

Environmental Management

---

The preceding electrical safety requirements are inadequate for work accomplished within confined spaces and/or explosive atmospheres. The HSS will provide electrical safety requirements if it becomes necessary to use electrical power within a confined space or explosive atmosphere.

Emergency procedures for dealing with electrical shock are provided in Section 8.0.

### 6.15 Noise

Exposures to harmful levels of noise may occur during the operation of mechanical equipment at the Decontamination Facility. Hearing protection is required to prevent harmful exposures whenever operating powered equipment such as the steam cleaner, trash pumps, skid steer, or forklift. For borderline noise threshold situations, a good rule of thumb is that if you have to raise your voice in order to communicate at a distance of three feet in the presence of steady state (continuous) noise, you should be wearing hearing protection such as disposable ear plugs. Hearing protection is available and should be in your standard field kit.

The DFSC shall include audiometric testing as part of the annual Medical Monitoring Program for their employees.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

70 of 119  
APR 15 1994

Effective Date:

Organization:

Environmental Management

---

### 7.0 SITE-SPECIFIC HEALTH AND SAFETY REQUIREMENTS

#### 7.1 Introduction

This section describes the health and safety requirements related to operations at the Decontamination Facilities (DF), including activities conducted at and associated with the DF. Activities conducted at the DF include inspections, decontamination, and water and sediment transfer and sample collection. Activities associated with the DF include operations such as pre-decontamination screening of equipment and handling of environmental waste containers. Procedures for these tasks are provided in the EMD Manual Operation, Standard Operating Procedures, Field Operations (FO) guidance document.

The following subsections describe monitoring instruments utilized to detect the presence of radioactive and chemical substances potentially presenting a risk to human health and the environment, outline monitoring strategies utilized by health and safety personnel, explain personnel protective equipment (PPE) ensembles designed to protect field personnel from identified health risks, and provide specific information about personal protective equipment ensembles utilized while performing DF operations.

#### 7.2 Monitoring Instruments

##### 7.2.1 Radioactive Substance Monitoring Instruments

Various instruments are used to monitor for the presence of radioactive substances on equipment to be decontaminated, around the DF pad area, and on personnel. The following instrumentation is used:

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

71 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

- ▶ A Bicron™ Field Instrument (or equivalent) for the Detection of Low Energy Radiation (FIDLER) is used to monitor gama radiation of PPE prior to disposal;
- ▶ A Ludlum™ Model 12-1A (or equivalent) is used to monitor alpha radiation on personnel and various dry surfaces in and around the DF;
- ▶ A Ludlum™ Model 31 (or equivalent) with a 44-9 "pancake" probe is used to detect any beta or gamma contamination on personnel or equipment prior to decontamination or unrestricted release;
- ▶ A Ludlum™ Model 2929 (or equivalent) is used to survey smear samples for alpha, beta, and gamma radiation contamination on various items for release to an unrestricted environment;
- ▶ A Bicron™ A-100 (or equivalent) is used to detect any alpha contaminants during a survey prior to decontamination or unrestricted release; and,
- ▶ A Bicron™ B-50 (or equivalent) is used to detect any beta contaminants during any survey of personnel or equipment.

The FIDLER is performance-checked on a 24-hour usage basis and calibrated yearly by EG&G Instrumentation. All other instruments are performance-checked by the Subcontractor HSS on a daily basis. The radiological instruments are calibrated by EG&G Instrumentation on a yearly basis or when calibration expires. The Ludlum™ Model 2929 is calibrated on an annual basis by the manufacturer.

A discussion of EMRGs relevant to the use and operation of the radioactive substance monitoring equipment is provided in Section 7.3.1.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

72 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.2.2 Chemical Substance Monitoring Instruments

Instruments utilized to monitor chemical substances include organic vapor detectors (OVDs) and detector tubes:

- ▶ A Thermo Environmental Instruments™ Organic Vapor Monitor (OVM) Model 580B (or equivalent) is utilized to detect organic vapors when opening waste containers. The OVM is a photoionization detector (PID) capable of ionizing compounds with an ionization potential of less than 11.7 eV (electron volts); and,
- ▶ Dräger™ colormetric detector tubes (or equivalent) are utilized to detect the presence of and quantify volatile organic compounds of concern (see Table 5-1) in the event of positive readings observed during PID monitoring.

The use and operation of the PID is outlined in Field Operations guidance FO.15. The PID is calibrated by the subcontractor HSS.

### 7.3 Monitoring Strategies

The objectives of site monitoring are to provide a rational basis for the selection of appropriate levels of personal protective equipment, work practice controls, and to document and verify that the selected hazard control procedures are appropriate for actual site conditions.

Real-time monitoring activities conducted at the DF includes field screening of equipment and containers for the presence of both radioactive and chemical substances. Additionally, samples collected from wash water and sediments are analyzed for radioactive and chemical substances

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	73 of 119
	Effective Date:	06/15/94
	Organization:	Environmental Management

---

by laboratories. Health and safety practices to be utilized when conducting field screening or collecting laboratory samples are provided in the following subsections.

A trained DFSC operator will be present during initiation of activities at the DF. Pre-decontamination survey results will be provided to the DFSC HSS prior to any DF activities. Real-time monitoring, as described below, will be conducted during operations, and the results provided to the SSO. The DF user will provide a qualified person to perform real-time monitoring during operations.

### 7.3.1 Monitoring for Radioactive Substances

Field screening for radioactive substances will be performed in accordance with appropriate Environmental Management Radiological Guidance (EMRG) documents. Detailed usage methodologies and action levels are provided in the EMRGs. The HSS will maintain a set of current EMRGs to serve as ready reference; a listing of EMRGs is provided in Table 7-1.

Frequencies of radiological surveys will be determined by the DFSC HSS in consultation with Radiological Engineering (RE) and in accordance with EMRG 3.1, 4-B96-ER-OPS-EMRG-03.02 and HSP 18.01.

### 7.3.2 Monitoring for Chemical Substances

Real-time monitoring will be conducted with the photoionization detector (PID) to provide an indication of potential volatile organic compound (VOC) hazards. The PID will be used as a screening device while performing activities with a reasonable potential for exposure to organic vapors, such as opening environmental waste containers or decontamination water holding tanks. If levels of organic vapors above background levels are detected, Dräger™ detector tubes (or

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

74 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

equivalent) will be utilized to assist in the identification and quantification of the specific compounds. The results of the monitoring will be compared to action levels to determine the appropriate level of PPE according to the decision logic provided in Section 7.4.2.2. Action levels for chemical substances are discussed in Section 7.4.2.3 and provided in Table 7-2. The following paragraphs describe monitoring strategies used for detecting chemical substances. The reader is instructed to refer to Section 7.4.3 for definitions of PPE ensembles.

Field personnel will follow the monitoring procedures, detailed below, when conducting the following activities:

- ▶ Opening and sampling containers of environmental waste;
- ▶ Opening and sampling decontamination water tanks; and,
- ▶ Decontaminating equipment and waste containers returning from field operations.

Available data will be reviewed for information about potentially hazardous VOCs associated with the container or equipment. Data may be obtained from the records of previous use of equipment decontaminated at the facility, or from analytical laboratory results, if prior sampling and analysis has been conducted. These data may be used to establish initial PPE requirements to conduct real-time air monitoring. If no data is available, the "worst case scenario" will be assumed.

The following sections detail air monitoring procedures for PIDs and colormetric detector tubes. PPE requirements to conduct the air monitoring vary according to available data; discussions of PPE requirements for each scenario follows the air monitoring procedure discussions.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

75 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### *Photoionization Detector Monitoring*

PID monitoring will be conducted only with a PID utilizing a lamp of at least 11.7 eV. Field personnel will verify the use of correct lamp prior to conducting any monitoring.

The sampling point will be approached from upwind while wearing appropriate PPE (described below) and conducting continuous air monitoring with the PID. If applicable, the sampling point will be opened the minimum amount necessary to insert the PID probe and conduct headspace monitoring. Care will be taken to avoid inserting the probe into liquids or solids in the container or tank.

Positive headspace readings will require immediate breathing zone monitoring. If PID readings indicate that headspace and breathing zone VOC levels are at or below background readings, work may proceed in Level D or Modified Level D PPE. Breathing zone VOC concentrations above background levels will warrant colormetric detector tube monitoring for compounds of concern, as described below.

### *Colormetric Detector Tube Monitoring*

The following volatile organic compounds of concern have been identified (see Table 5-1) as reasonably anticipated to be present:

- ▶ Chloroform;
- ▶ Carbon Tetrachloride;
- ▶ Methylene Chloride;

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	76 of 119
	Effective Date:	06/15/94
	Organization:	Environmental Management

---

- ▶ 1,1,2,2-Tetrachloroethane;
- ▶ Trichloroethene; and,
- ▶ Xylenes.

Additional compounds may be added to this list following analysis of laboratory analytical results. :

Colormetric detector tube monitoring will be conducted in Level B PPE in order to verify or eliminate the presence of these compounds. Positive readings at concentrations which exceed action levels presented in Section 7.4.2.3 and Table 7-2 for these compounds will require workers to exit the work zone. Workers will contact the HSS for instruction on procedures to follow. The HSS, at his discretion, may elect to either allow the sample point to vent, with periodic monitoring to measure VOC and compound of concern concentrations, or require workers to conduct activities in Level B respiratory protection. The Buddy System is required for any work conducted in Level B respiratory protection.

Colormetric detector tube monitoring eliminating the presence of any volatile organic compounds of concern, or identifying that levels are below Level B action levels, will allow downgrading of PPE to Level C or Level D respiratory protection, as appropriate.

94-DMR-ERM-0061

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

77 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### *Initial Air Monitoring PPE Requirements*

#### Scenario I: Data Indicates That No Compounds of Concern are Present

If the tank or container has been characterized by analytical laboratories as not containing compounds of concern, initial air monitoring may be conducted in Level D respiratory protection. Headspace monitoring, as described above, will be conducted, followed by immediate breathing zone monitoring if PID readings above background are obtained. If positive PID readings are observed in either the sample point headspace or the worker breathing zone, the worker will exit the work zone, contact the HSS, and conduct air monitoring according to the Scenario II procedure. If no headspace PID readings are observed, work may continue in the task-specific PPE as described in Section 7.5.

#### Scenario II: Data Indicates the Presence of Compounds of Concern, or No Data is Available

If the tank or container has been identified by analytical laboratories as containing compounds of concern, or no data regarding the contents are available, initial air monitoring will be conducted in Level C respiratory protection. Headspace monitoring, as described above, will be conducted, followed by immediate breathing zone monitoring if PID readings above background are obtained. If positive PID readings are observed in either the sample point headspace or the worker breathing zone, the worker will exit the work zone, contact the HSS, obtain Level B respiratory protection equipment (if necessary), and conduct colormetric detector tube monitoring in Level B respiratory protection, if required by the HSS. Work will be conducted in respiratory protection required by action levels specified in Section 7.4.2.3 and Table 7.2. If no headspace PID reading are observed, work may continue in the task-specific PPE as described in Section 7.5.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	78 of 119
	Effective Date:	07/18/94
	Organization:	Environmental Management

---

### 7.4 Personal Protective Equipment

Personal Protective Equipment (PPE) comprises the "last line of defense" against health hazards, following engineering controls and good work practices. Engineering controls to protect workers from exposure to health hazards while conducting DF operations include utilization of covered aboveground holding tanks for sediments and decontamination water. Good work practices are identified in appropriate FOs.

PPE for activities conducted at the DF consists of clothing to protect the workers from physical, radiological, or chemical hazards, and respiratory protection to reduce or eliminate the potential for inhalation of hazardous substances.

The following subsections describe general PPE clothing and respirator requirements for operations conducted at the DF. PPE ensembles (complementary clothing and respirator requirements) are outlined in Section 7.4.3. PPE requirements for specific DF operations are provided in Section 7.5.

#### 7.4.1 Clothing

PPE clothing consists of items designed to protect the worker from physical, radiological, and chemical hazards. The basic field work uniform consists of Department of Energy (DOE) cotton coveralls, steel-toed work boots, and safety glasses. A personal radiation dosimetry badge will be worn when conducting RCA ~~or field~~ activities. Hard hats are to be worn in situations presenting a potential hazard from falling objects, and leather gloves may be warranted for activities with the potential for cuts or puncture wounds to the hands.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

79 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Upgrading the basic uniform will provide additional protection from dust and liquid hazards. Disposable chemical-resistant coveralls, such as Tyvek™ or equivalent, protect the worker from skin contact with airborne contaminants. If a splash hazard is present, the coveralls may be further upgraded to a coated material such as Saranex™ or equivalent. Alternatively, splash protection may be afforded by wearing an apron.

Hand, foot, and face protection may be similarly upgraded. Surgical rubber inner gloves, possibly combined with nitrile or butyl outer gloves, provide hand protection from dust or liquid chemical hazards. Foot protection may be upgraded with chemical-resistant boots. The face may be protected from splash hazards by a face shield.

It should be noted that coverall sleeves and legs will be worn over or under the cuffs of gloves and boots depending on the specific hazard presented by a given task. If a splash hazard exists, sleeves and legs will be worn outside gloves and boot covers. If a dust hazard is present, the coverall sleeves and legs will be worn inside glove cuffs and boot covers. Tape will be used to seal the joints between coveralls, protective gloves, and cuffs.

### 7.4.2 Respirators

Respirators provide workers with protection from the inhalation of hazardous substances. Respiratory protection ranges from the simple dust mask, to quarter-, half- or full-face air-purifying respirator (APR), and self-contained breathing apparatus (SCBA) or supplied-air line with escape SCBA. For DF operations, respiratory protection will consist of full-face APRs upgrading to SCBAs if monitoring indicates that additional respiratory protection is required. A full-face respiratory with high efficiency particulate-air (HEPA) organic vapor/acid gas and radionuclide cartridges will be utilized if air monitoring indicates that Level C respiratory

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	80 of 119
	Effective Date:	06/15/94
	Organization:	Environmental Management

---

protection is warranted. If Level B respiratory protection is required, the sub-contractor will obtain SCBA equipment from the EG&G Project Manager.

Respirators will be maintained in accordance with an EG&G-approved Respiratory Protection Program maintenance schedule. Respirators will be inspected on a semi-annual basis at a minimum. If used as part of an Emergency Response program, respirators will be inspected on a monthly basis at a minimum.

Before being taken in the field, each APR will be inspected, appropriate cartridges installed, a positive and negative pressure check conducted, and the entire APR assembly will be sealed in a plastic bag. The APR will remain in the sealed bag until needed. If the APR is not used and the sealed bag is not damaged, the respirator may remain at the work site inside an area protected from weather. The enclosed cab of a vehicle is considered to be one example of a protected area.

After the APR has been used, the following cleaning and maintenance procedures will be followed:

- ▶ Cartridges from the APR will be removed and disposed of as contaminated PPE weekly, or whenever monitoring indicates that the cartridges have been exposed to concentrations of contaminants above Permissible Exposure Limits (PELs);
- ▶ The APR interior and exterior will be smear tested for radioisotopes before being cleaned if radioactivity was detected while the APR was being used. If the smear test indicates the presence of radioactivity, the APR will be thoroughly cleaned with premoistened towellettes and smear tested again. The used towellettes will be disposed of as contaminated PPE;

94-DMR-ERM-0061

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

81 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

- ▶ If the second smear test indicates the presence of radioactivity, the APR will be sealed in a plastic bag, the bag will be labelled to indicate the presence of radioactivity on the APR, and the SSO notified. APRs found to be radiologically contaminated will not be placed in the cleaning and rinse solutions at the shower trailer;
- ▶ For APRs not exposed to radiological contamination, the APR face piece interior and exterior will be wiped down with premoistened towellettes and subsequently sealed in a plastic bag for transport to the APR cleaning station at the shower trailer; and,
- ▶ After the APR has been cleaned and rinsed, it will be dried with a clean towel and stored in a clean, sealed plastic bag.

### 7.4.2.1 Respiratory Protection Program

Personnel performing tasks which require respiratory protection will be trained and fitted for respirators in accordance with an EG&G-approved respiratory protection program. Subcontractors may either submit their own Respiratory Protection Programs for EG&G approval or comply with the EG&G Respiratory Protection Program provided in HSP 1-G2200-HSP-7.03. Subcontractors using the DF are responsible for ensuring that their employees comply with their respiratory program. Each individual is responsible for the cleaning, inspecting, maintenance, and storage of any APR they use.

The Respiratory Protection Program will include, at a minimum, the following elements:

- ▶ Requirements for appropriate medical surveillance, fit testing, and training in the use of APRs and SCBAs;
- ▶ Requirements for respiratory maintenance programs; and,
- ▶ Requirements for documentation of respirator usage.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

82 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Additional program requirements are provided in the EG&G Respiratory Protection Program.

### 7.4.2.2 Respirator Decision Logic

The decision to wear respiratory protection is based on the potential for hazardous constituents to be present in the breathing zone of the worker. Situations with a known potential for the presence of such constituents, such as opening drums containing environmental materials characterized as hazardous by an analytical laboratory, require respiratory protection while conducting real-time monitoring with a PID. Other situations, such as opening drums which have materials not yet characterized by an analytical laboratory, have an unknown potential for the presence of airborne hazardous constituents and also require respiratory protection. Finally, some situations have no potential for the presence of airborne hazardous constituents and require no respiratory protection.

Each of these situations requires a different response by the field worker. The field worker, in conjunction with the HSS, will utilize the monitoring strategies presented in Section 7.3 to determine appropriate respiratory protection.

### 7.4.2.3 Respirator Action Levels

Real-time air monitoring, as described in Section 7.3, will provide field workers with information necessary to determine appropriate respiratory protection. Certain threshold values have been established for particular compounds; the exceedance of these values requires a specific action. Accordingly, these values are termed "action levels". Action levels have been set requiring the upgrade from no respiratory protection (Level D and Modified Level D) to APRs (Level C), and from APRs to SCBAs or supplied air with escape SCBAs (Level B).

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

83 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Action levels for radioisotopes are defined in EMRG 3.1; action levels for organic compounds have been established at one-half of the most conservative published exposure limits for specific compounds recommended by ACGIH or OSHA.

PIDs provide qualitative data. PIDs respond to various compounds according to the calibration standard for the instrument, the power of the instrument, and the compound's ionization potential. Accordingly, action levels for PID instrument use have been set at any reading above background. The required action when this level is attained is to relocate upwind of the source, allow the source to vent, contact the HSS, and, if requested, conduct colormetric detector tube monitoring. Colormetric detector tubes provide quantitative data about concentrations of compounds of concern. Action levels for volatile organic compounds of concern are provided in Table 7-2.

### 7.4.3 Personal Protective Equipment Ensembles

PPE ensembles consist of certain clothing and respiratory protection elements which, in combination, protect the wearer against certain physical, radiological, and chemical hazards. Established PPE ensembles are described generally below; it should be noted that each ensemble may be modified slightly by task-specific requirements to address particular hazards associated with that task. Task-specific PPE requirements are provided in Section 7.5 and summarized in Table 7-3.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

84 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.4.3.1 Level D

Level D PPE is worn while performing tasks with little or no potential for exposure to contaminants. Such activities include office work, industrial or cargo truck operation, and moving sealed containers. It is the basic work uniform.

Level D PPE consists of:

- ▶ RFP-provided Department of Energy (DOE) cotton coveralls, to be changed daily;
- ▶ Steel-toed boots;
- ▶ Safety glasses with side shields or equivalent;
- ▶ Additional seasonal items, as necessary;
- ▶ Leather gloves (when handling sharp objects); and,
- ▶ Hard hat if an overhead hazard is present.

### 7.4.3.2 Modified Level D

Modified Level D PPE represents an upgrade of Level D PPE to address possible skin contact with contaminants. Modified Level D PPE is to be worn when conducting tasks with the potential for splash or dust exposure to hazardous constituents, but no respiratory protection is necessary. Tasks requiring Modified Level D PPE include DF pad inspections and container sampling.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

85 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Modified Level D PPE consists of Level D PPE and the following additional items:

- ▶ Disposable chemical-resistant gloves (nitrile or equivalent);
- ▶ 16"- high chemical-resistant steel-toed, steel shank boots;
- ▶ Uncoated chemical-resistant disposable coveralls (Tyvek™ or equivalent) if no splash potential exists, or coated chemical-resistant disposable coveralls (Saranex™ or equivalent) if a splash potential is present;
- ▶ Coverall sleeves and legs will be worn over or under the cuffs of gloves and boots depending on the specific hazard presented by a given task. If a splash hazard exists, sleeves and legs will be worn outside gloves and boot covers. If a dust hazard is present, the coverall sleeves and legs will be worn inside glove cuffs and boot covers. Tape will be used to seal the joints between coveralls, protective gloves, and cuffs;
- ▶ Additional seasonal items, as necessary, worn under the disposable coverall;
- ▶ Faceshield if a splash hazard exists and no contaminants have been detected; and,
- ▶ Laboratory apron and arm sleeves, or knee-length vinyl raincoat, for splash hazards if uncoated disposable coveralls are worn.

### 7.4.3.3 Level C

Level C PPE provides protection from contaminants with chemical-resistant coveralls and respiratory protection. Level C PPE is to be worn when conducting DF operations with the potential for exposure to air-borne hazardous constituents requiring respiratory protection.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

86 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

Level C PPE consists of:

- ▶ RFP-provided DOE cotton coveralls to be changed daily;
- ▶ Uncoated chemical-resistant disposable coveralls (Tyvek<sup>™</sup> or equivalent) if no splash potential exists, or coated chemical-resistant disposable coveralls (Saranex<sup>™</sup> or equivalent) if a splash potential is present;
- ▶ Coverall sleeves and legs will be worn over or under the cuffs of gloves and boots depending on the specific hazard presented by a given task. If a splash hazard exists, sleeves and legs will be worn outside gloves and boot covers. If a dust hazard is present, the coverall sleeves and legs will be worn inside glove cuffs and boot covers. Tape will be used to seal the joints between coveralls, protective gloves, and cuffs;
- ▶ Additional seasonal items may be required. Any such items will be worn under the disposable coverall;
- ▶ Disposable chemical resistant inner gloves;
- ▶ Butyl or nitrile outer gloves;
- ▶ 16"-high chemical-resistant steel toed, steel shank boots; and,
- ▶ Full-face APR with appropriate cartridges for detected radiological contaminants greater than EMRG 3.2 release limits. The appropriate cartridge will be a type that provides protection against organic vapors and radioisotopes.

### 7.4.3.4 Level B

Level B PPE represents an upgrade from Level C PPE respiratory protection and is characterized by a change from APRs to SCBA or supplied air with an escape SCBA. Level B PPE is utilized if radiological monitoring indicates the presence of radioactivity greater than

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

87 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

50 times the release limits for unrestricted use (EMRG 3.1), or if organic vapor monitoring indicates that the protection factors afforded by respirators do not provide sufficient protection from the levels of organic vapors detected.

Level B PPE consists of the following:

- ▶ RFP-provided DOE cotton coveralls, to be changed daily;
- ▶ Disposable coated chemical-resistant coveralls (Saranex<sup>™</sup> or equivalent) worn over the cotton coveralls. "Coated" coveralls are defined as coveralls that are sewn together using a bound or sealed seam and water vapor transmission of the material is rated as "none" by ASTM testing method E96. All joints will be taped and sealed;
- ▶ Coverall sleeves and legs will be worn over or under the cuffs of gloves and boots depending on the specific hazard presented by a given task. If a splash hazard exists, sleeves and legs will be worn outside gloves and boot covers. If a dust hazard is present, the coverall sleeves and legs will be worn inside glove cuffs and boot covers. Tape will be used to seal the joints between coveralls, protective gloves, and cuffs;
- ▶ Additional seasonal items may be required. Any such items will be worn under the disposable coverall;
- ▶ Disposable chemical-resistant inner gloves that may be worn over disposable cotton liners;
- ▶ Butyl or nitrile outer gloves;
- ▶ 16"-high chemical resistant steel-toed and steel shank boots;
- ▶ Disposable chemical-resistant boot covers; and,
- ▶ Pressure-demand full-face self-contained breathing apparatus (SCBA), or supplied air respirator with escape SCBA.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

88 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5 Required Levels of Personal Protective Equipment Per Task

Tasks performed at or associated with activities at the DF are conducted in accordance with appropriate FOs. A listing of FOs relevant to DF operations is provided in Table 7-3. Any task performed by the DFSC not described below or in a FO listed in Table 7-3 may be considered a special circumstance and require consultation with the HSO and EG&G PM to identify health and safety issues associated with the task. As described in Section 7.5.15, special circumstances will require preparation of a task-specific Health & Safety Plan by the subcontractor HSO.

This section briefly outlines activities associated with each task, and identifies PPE requirements to perform those activities. PPE requirements for each task are also presented in Table 7-3. In all cases where air monitoring is required the monitoring strategies provided in Section 7.3 will be utilized prior to initiation of intrusive activities.

#### 7.5.1 FO.01: Air Monitoring and Dust Control

##### *Task Description*

Air monitoring and dust control activities at the DF are not conducted by the DFSC or DF users.

##### *PPE Requirements*

At a minimum, Level D PPE is required for this task.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

89 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

### 7.5.2 FO.03: General Equipment Decontamination

#### *Task Description*

General equipment decontaminated at the DF consists of sampling and monitoring equipment utilized by field crews and the DFSC, and uncontaminated or potentially contaminated drums. Procedures to conduct general equipment decontamination include the following steps:

- ▶ Prior to arriving at the DF, the user will conduct a pre-decontamination radiological survey for alpha, beta, and gamma contamination, including an equipment frisk and a smear sample for removable contamination. Additionally, the user will conduct an organic vapor monitoring survey with an Organic Vapor Detector;
- ▶ Survey results will be reviewed by the DFSC and user HSSs for elevated levels of contamination (above EMRG 3.1 guidelines for radiological parameters or above action levels provided in Table 7-2 for organic vapors). RE will be notified if elevated levels are identified;
- ▶ If the equipment to be decontaminated originates in an RCA, an RWP will be developed and the DF will be posted as an RCA during decontamination activities. If the equipment does not originate from an RCA, no special posting is required unless directed by RE;
- ▶ Following acceptance of survey results, the equipment will be decontaminated by the user, using the pressurized steam cleaner. General procedures for equipment decontamination require removal of residual contaminants, placement of the equipment on the wash rack with open end down (if applicable), and standing upwind or crosswind of the equipment while using the steam cleaner. The equipment is to be placed in a clean area to air dry;
- ▶ The user will conduct a post-decontamination radiological survey of the equipment if radiological contamination was detected prior to decontamination; and,

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

90 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

- ▶ The user will conduct a post-decontamination radiological survey of the DF if the DF was posted as an RCA or radiological contamination was detected on equipment prior to decontamination, and provide the results to the DFSC HSS.

### *PPE Requirements*

Refer to Section 7.3 for PPE requirements for air monitoring.

PPE utilized to conduct the pre- and post-decontamination radiological and organic vapor monitoring surveys consists of Level D. If the radiological frisk identifies radiological contamination above EMRG 3.1 limits or the organic vapor survey identifies organic vapor contamination above Table 7-2 action levels, the surveys will be discontinued, Level C or Level B (if applicable) PPE donned, and the surveys completed.

PPE utilized while performing the decontamination activities after initial air monitoring, if necessary, is comprised of Modified Level D, with coated disposable chemical-resistant coveralls such as Saranex™ or equivalent. Additionally, a faceshield and nitrile or butyl gloves will be worn.

Modified Level D PPE may be upgraded to Level C or Level B (if applicable) if pre-decontamination survey results indicate the EMRG 3.1 limits or organic vapor action levels have been exceeded.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	91 of 119
	Effective Date:	07/18/94
	Organization:	Environmental Management

---

### 7.5.3 FO.04: Heavy Equipment Decontamination

#### *Task Description*

Heavy equipment decontaminated at the DF includes drilling rigs, forklifts, backhoes, and front-end loaders. Heavy equipment decontamination procedures and PPE requirements are identical to general equipment procedures and requirements. Specifically, procedures to conduct heavy equipment decontamination include the following steps:

- ▶ Prior to arriving at the DF, the user will conduct a pre-decontamination radiological survey for alpha and beta/gamma, both for removable and fixed plus removable contamination. This survey will be performed in accordance with EMRG 3.02. Additionally, the user will conduct an organic vapor monitoring survey with an Organic Vapor Detector;
- ▶ Survey results will be reviewed by the DFSC and user HSSs for elevated levels of contamination (above EMRG 3.02 guidelines for radiological parameters or above action levels provided in Table 7-2 for organic vapors). RE will be notified if elevated levels are identified;
- ▶ If the equipment to be decontaminated originates in an RCA, an RWP will be developed and the DF will be posted as an RCA during decontamination activities. If the equipment does not originate from an RCA, no special posting is required;
- ▶ Following acceptance of survey results, the equipment will be decontaminated by the user, using the pressurized steam cleaner. General procedures for equipment decontamination require removal of residual contaminants, and standing upwind or crosswind of the equipment while using the steam cleaner. The equipment is to be placed in a clean area to air dry;

94-DMR-ERM-0068

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

92 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

- ▶ The user will conduct a post-decontamination radiological survey of the equipment if radiological contamination was detected prior to decontamination; and,
- ▶ The user will conduct a post-decontamination radiological survey of the DF if the DF was posted as an RCA or radiological contamination was detected on equipment prior to decontamination, and provide the results to the DF HSS.

### *PPE Requirements*

Refer to Section 7.3 for PPE requirements during air monitoring.

PPE utilized to conduct the pre- and post-decontamination radiological and organic vapor monitoring surveys consists of Level D. If the radiological frisk identifies radiological contamination above EMRG 3.1 limits or the organic vapor survey identifies organic vapor contamination above Table 7-2 action levels, the surveys will be discontinued, Level C or Level B (if applicable) PPE donned, and the survey completed.

PPE utilized while performing the decontamination activities after initial air monitoring, if necessary, is comprised of Modified Level D, with coated disposable chemical-resistant coveralls such as Saranex<sup>™</sup> or equivalent. Additionally, a faceshield and nitrile or butyl gloves will be worn.

Modified Level D PPE may be upgraded to Level C or Level B (if applicable) PPE if pre-decontamination survey results indicate the EMRG 3.1 limits or organic vapor action levels have been exceeded.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

93 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5.4 FO.05: Handling of Purge and Development Water

#### *Task Description*

Purge and development water originating from groundwater monitoring wells characterized as nonhazardous is disposed of in the DF sedimentation tanks. The water is transported to the DF by the field crew in a pickup truck-mounted tank, and transferred into the sedimentation tanks by the field crew and the DFSC through a pump and purge hose. The water is pumped through the DF separators into Sedimentation Tank 1.

#### *PPE Requirements*

PPE requirements for purge and development water transfer operations is comprised of Level D PPE with the addition of ear plugs, nitrile or butyl gloves, and a splash apron.

### 7.5.5 FO.06: Handling Personal Protective Equipment

#### *Task Description*

PPE generated from DF operations is disposed of at the DF. PPE disposal requirements vary according to whether the PPE is radiologically contaminated or not contaminated. Contaminated PPE includes both chemical and radiological contamination, as determined by the source of the PPE (an RCA, for example), or radiological or PID organic vapor surveys. Uncontaminated PPE is disposed of in a DF disposal container. When the container is full, the DF HSS will conduct a FIDLER gamma survey of the PPE to verify that no radiological contamination is present. If the PPE is identified as radiologically contaminated, RE will be notified and the

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	94 of 119
	Effective Date:	07/18/94
	Organization:	Environmental Management

---

DFSC will dispose of the PPE according to RE guidelines. If the results of the FIDLER gamma survey indicate that the PPE is not radiologically contaminated, the PPE will be disposed of as uncontaminated material. Disposal for uncontaminated PPE consists of placing the PPE in double plastic bags, sealing the bags, labelling them as uncontaminated PPE, and transferring the PPE to EG&G Environmental Operations Personnel.

Contaminated PPE will be subjected to a radiological survey to determine if PPE contamination levels exceed EMRG 3.02 levels. PPE which is found to exceed EMRG 3.02 levels will be placed in double plastic bags and labelled "RADs detected (# of counts detected)" as appropriate. Chemically contaminated PPE which is found to not exceed EMRG 3.02 levels will be placed in double plastic bags labelled as "No Rads Detected". In either case, the plastic bags will be placed in appropriate cargo containers as designated by EG&G for future EG&G disposition.

Additional used PPE for disposal may be generated by the DFSC in the office laboratory utilized for analyzing smear samples. The laboratory area is designated as an RCA. The DFSC HSS will conduct an initial alpha, beta, and gamma radiation frisk of the PPE, analyze the swipe samples, and bag the PPE as described above.

### *PPE Requirements*

PPE to be utilized for handling used PPE consists of Level D with nitrile or butyl gloves.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

95 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5.6 FO.07: Handling of Decontamination Water and Wash Water

#### *Task Description*

Water generated from decontamination and wash activities is disposed of at the DF. Water may be generated from field activities or from DF pad activities. The water flows to or is placed in the DF sump, and is pumped through the separators to Sedimentation Tank 1. After allowing solids to settle, the DFSC transfers liquids to Sedimentation Tank 2 via gravity flow and a manually-operated valve. Additional settling occurs in Sedimentation Tank 2 and Sedimentation Tank 3, which is filled by gravity flow from Sedimentation Tank 2. Liquids in Sedimentation Tank 3 are pumped by the DFSC into the holding tanks. The holding tanks are sampled when full, and pumped into a tanker truck for subsequent disposal.

#### *PPE Requirements*

Refer to Section 7.3 for air monitoring PPE requirements.

PPE required for non-pumping transfer operations consists of Level D with nitrile or butyl gloves.

PPE utilized for pumping transfer operations consists of Level D PPE with the addition of ear plugs, nitrile or butyl gloves, and a splash apron.

PPE requirements for sampling activities after initial air monitoring, if necessary, consists of Modified Level D, with coated disposable coveralls and nitrile or butyl gloves.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

96 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5.7 FO.10: Receiving, Labelling, and Handling Environmental Materials Containers

#### *Task Description*

Environmental materials containers are inspected to verify that the integrity of the containers has not been compromised. Containers are labelled appropriately and moved on a pallet with a forklift or individually with a drum grapppler.

#### *PPE Requirements*

PPE requirements for receiving, and handling environmental materials containers consists of Level D. Hard hats are to be worn if drums will be lifted higher than 72", and leather gloves are to be worn in all situations requiring manual movement of the containers.

### 7.5.8 FO.11: Field Communications

#### *Task Description*

Field crews will utilize the buddy system, and radio communication is required. Knowledge of audible alarms, as described in Section 8.4, is required. Hand signals may be appropriate in high noise situations.

#### *PPE Requirements*

Field communications require, at a minimum, no special PPE.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

97 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5.9 FO.12: Decontamination Facility Operations

#### *Task Description*

Decontamination Facility operations include equipment decontamination and water transfer activities as described above, as well as personal decontamination, sediment transfer, and collection of sediment and water samples.

Personal decontamination procedures include the use of plastic tubs to contain decontamination water. Tubs are emptied into the DF sump and decontaminated as general equipment.

Sediments are transferred from the sedimentation tanks to the sump. Sediments from Sedimentation Tank 1 are transferred via a bottom drain; sediments from Sedimentation Tanks 2 and 3 are transferred with a pump.

Sedimentation sampling is conducted when the sump is full of sediments. The sump is opened and the sediments are mixed with a bucket mounted to a skid-steer truck. A composite sample is collected by retrieving four samples from each side of the sump (totalling eight), and placing the samples in a transfer container. The composited samples are mixed thoroughly and poured into sample bottles for analysis. The exterior of the bottles are decontaminated and surveyed for alpha, beta, or gamma fixed or removable contamination. If radiological contamination is identified, the bottles are re-decontaminated and checked again for unrestricted release. The bottles are then placed in a cooler for subsequent shipment to an analytical laboratory.

Following completion of the sampling, the sediments in the sump are transferred to environmental materials containers (drums). A trash pump or bladder pump is utilized if the

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

98 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

sediments are sufficiently liquid. If the sediments are too solid for pump utilization, the bucket mounted to the skid steer is utilized. Upon completion of the transfer, the drums are capped and visually inspected. The exterior of the drums is decontaminated if necessary.

The drums are then placed in a holding area to allow the contents to settle. After 1 to 2 weeks, the drums are opened and liquids are decanted using a wet vacuum. Decanted liquids are returned to the sump.

### *PPE Requirements*

Refer to Section 7.3 for air monitoring PPE requirements prior to FO.12 intrusive activities.

PPE requirements for transferring sediments are identical to PPE for pumping; specifically, Level D PPE with the addition of ear plugs, nitrile or butyl gloves, and a splash apron.

Mixing activities require Modified Level D PPE with coated disposable coveralls such as Saranex<sup>™</sup> or equivalent.

Pumping activities at the DF require Modified Level D PPE with a splash apron and the addition of a faceshield and ear plugs.

Sampling activities require Modified Level D PPE with coated disposable chemical-resistant coveralls such as poly-coated Tyvek<sup>™</sup> (or equivalent).

Decanting activities require Modified Level D PPE with a splash apron and the addition of ear plugs.

94-DMR-ERM-0061

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT	Manual:	RFP/ER-SAF-93-DCON
	Revision No.:	0
	Page:	99 of 119
	Effective Date:	06/15/94
	Organization:	Environmental Management

---

### 7.5.10 FO.13: Containerization, Preserving, Handling and Shipping of Soil and Water Samples

#### *Task Description*

Soil and water samples originating from the DF are collected and shipped to analytical laboratories for analysis. Soil (sediment) samples are collected according to the procedure outlined above. Water samples are collected from the DF holding tanks using a 7'-long point source bailer, transferred to a composite bottle, and then transferred to appropriate sample bottles. The exterior of the bottles is surveyed for radiological contamination and decontaminated as necessary.

Water samples are preserved by the placement of liquid preservatives in the bottles prior to transfer of the samples. Placement of the preservative is performed in the DFSC office laboratory. The activities are performed in a well-ventilated area, on a table with a lipped edge to contain any spillage. A pipette is used to place the preservative in the bottle.

Sample bottle handling includes a direct frisk and smear sample radiological survey for alpha, beta, and gamma contamination. The sample bottles are decontaminated as necessary, placed in sealed plastic bags, and shipped in a sealed cooler. Water used for decontaminating bottle exteriors is disposed in the DF sump.

Shipping requirements for soil and water samples includes preparation of appropriate paperwork and assurance that the shipment is in compliance with relevant DOT shipping requirements.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

100 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### *PPE Requirements*

Refer to Section 7.3 for air monitoring PPE requirements.

PPE requirements for collection of water samples includes Level C after initial air monitoring, if necessary, when opening the holding tank while conducting air monitoring as described in Section 7.3.2. Following verification that concentrations of VOCs in the work area are at background levels, Modified Level D PPE with coated disposable coveralls may be worn during sample collection.

Sample preservation PPE requirements consist of Modified Level D with a splash apron and a faceshield.

Level D PPE with nitrile or butyl gloves is required when handling sample bottles.

No PPE is required when shipping sample containers.

### 7.5.11 FO.15: Photoionization Detectors (PID) and Flame Ionization Detectors (FID)

#### *Task Description*

Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs) are used at the DF when conducting daily facility-opening inspections, and when opening the sump, holding or sedimentation tanks, or drums which have not been characterized as containing nonhazardous chemicals. Specific monitoring strategies for these instruments are described in Section 7.3.2.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

101 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### *PPE Requirements*

Refer to Section 7.3 for air monitoring PPE requirements.

Refer to task-specific descriptions for PPE requirements during PID or FID monitoring.

#### 7.5.12 FO.16: Field Radiological Measurements

### *Task Description*

Field radiological measurements are performed by RPTs or the DFSC HSS. Measurements include collection and survey of smear samples, as well as field frisks of personal and equipment. The results of the surveys are typically compared to EMRG 3.1 and 3.2 release criteria.

### *PPE Requirements*

In RCAs, PPE requirements for conducting field radiological measurements consists of Modified Level D, with disposable coveralls such as Tyvek<sup>™</sup> or equivalent. PPE may be upgraded to Level C (respiratory protection) if required on the RWP.

For non-RCA field radiological measurements, PPE requirements are Level D and nitrile or butyl gloves.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

102 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5.13 FO.18: Environmental Sample Radioactivity Content Screening

#### *Task Description*

Environmental sample radioactivity content screening is conducted by the DFSC HSS. Water and sediment samples collected from the DF tanks and sump are screened for surface radioactivity prior to shipment to analytical laboratories.

#### *PPE Requirements*

PPE requirements for conducting environmental sample radioactivity content screening consists of Level D with nitrile or butyl gloves.

### 7.5.14 FO.25: Shipment of Radioactive Materials Samples

#### *Task Description*

Radioactive materials samples are shipped to analytical laboratories for analysis. Samples are shipped by the DFSC after appropriate survey and decontamination, if necessary, as described in Section 7.5.10.

#### *PPE Requirements*

The task does not require PPE by the DFSC or DF user.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

103 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 7.5.15 Other Tasks Conducted by the Decontamination Facility Subcontractor

#### *Task Description*

The Decontamination Facility Subcontractor may be required to perform tasks which are not specifically provided for in the FOs listed above. In the event that the subcontractor is requested by EG&G to perform "out of scope" tasks, the individual requesting performance of the task will complete a Health and Safety information form for the DFSC. A Special Task Health and Safety Plan will be prepared by the DFSC Health and Safety Officer. The information form and Special Task Health and Safety Plan are provided in Appendix E.

#### *PPE Requirements*

Refer to Section 7.3 for air monitoring PPE requirements.

The specific risks associated with each task must be assessed based on information provided by the requestor, and appropriate PPE selected by the HSO in consultation with the EG&G PM, if necessary.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

104 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 8.0 EMERGENCY RESPONSE PROCEDURES

#### 8.1 Radio Communications

Field teams will have a method of communicating with both the field office trailer and other field teams. Radio communications are required.

A communication center will be established at the field trailer office. This office will be equipped with telephone communications and shall be attended at all times during operations. Emergency telephone numbers will be posted near the field office telephone.

#### 8.2 Emergency Telephone

The closest accessible telephone during all working hours will be identified by the HSS before beginning field activities in case communication with the communications center is not possible. All guard posts have telephones.

#### 8.3 Medical Facilities

Telephone numbers for the RFP medical facility are provided below (Building 122, Central Avenue, Figure 8-1):

- ▶ General Information 966-2594
- ▶ Ambulance Service 966-2911

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

105 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 8.4 Emergency Response Procedures

The Site Manager, with assistance from the HSS, has responsibility and authority for coordinating all emergency response activities until proper authorities arrive and assume control.

The DFSC will develop an Emergency Response Exercise program, submitted to EG&G for approval, in order to practice Emergency Response procedures prior to an actual emergency.

At a minimum, the Emergency Response Exercise should involve a reasonable emergency scenario that requires actions in the following areas:

- ▶ Emergency recognition;
- ▶ Safe distance and place of refuge (assembly area) designation;
- ▶ Site security and control;
- ▶ Evacuation routes;
- ▶ Emergency treatment and first aid;
- ▶ Personnel and equipment decontamination;
- ▶ Emergency communications;
- ▶ PPE and emergency equipment uses; and,
- ▶ A follow-up meeting to discuss effectiveness of the exercise and recommended actions.

An Emergency Response Exercise shall be conducted on a minimum 6-month frequency basis.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

106 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Audible emergency alarms are used at Rocky Flats to alert personnel of specific emergencies. A list of the specific warnings, associated sound, and instructions for response, is provided in Table 8-1.

### 8.4.1 Fire/Explosion

Fire emergencies will be handled by immediately notifying the fire department. Only if a fire appears to be small and easily extinguishable will personnel attempt to control it with fire extinguishers available in the work area. Otherwise, immediate evacuation of the area is required. In the event of an explosion, all personnel shall be evacuated and the fire department notified. No one shall re-enter the area until re-entry has been cleared by the fire department.

### 8.4.2 Physical Injury

In case of injuries to personnel, first aid treatment will be initiated immediately by trained personnel. In case of serious injuries, the victim will be transported to the Rocky Flats Plant Occupational Health Department (OHD) as soon as possible. Minor injuries may be treated on site, but all injured personnel will be transferred to the nearest recommended medical treatment facility and examined by trained medical personnel. Victims of serious bites or stings will be taken to the RFP OHD. In the event that an injured person is contaminated with chemicals or radionuclides, the person shall be taken to the RFP OHD as soon as possible. Decontamination shall be performed to prevent further exposure only if it will not aggravate the injury. Treatment of life-threatening or serious injuries will always be considered first.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

107 of 119

Effective Date:

06/15/94

Organization:

Environmental Management

### 8.4.3 Injury Due to Heat

If a person is suffering from heat exhaustion (profuse perspiration, normal body temperature), the following procedures will be taken:

- ▶ Remove the person to a cooler, shaded area;
- ▶ Notify and take instructions from the RFP OHD personnel;
- ▶ Give 8 ounces of Gatorade (if available) every 15 minutes for three or four doses. Drinking water will be used if Gatorade is not readily available;
- ▶ Allow the person to rest;
- ▶ If the person is suffering from cramps, press warm, wet towels over the cramped area; and,
- ▶ Recommend that the individual consult with their personal physician.

A life threatening situation exists and **immediate action** is indicated if a person is suffering from heat stroke (skin hot and dry, very high body temperature); the following procedures will be taken:

- ▶ **Immediately** contact the HSS and request the medical facility personnel to respond to the incident location, and take instructions from the medical personnel for care of the victim until their arrival;
- ▶ Cool the victim quickly by soaking the person in cool (but not cold) water, sponging the body with rubbing alcohol or cool water, or pouring water on the body; and,
- ▶ Transport to hospital for medical attention as quickly as possible.

94-DNR-ERM-0061

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

108 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 8.4.4 Injury Due to Cold

First aid for frostbite consists of the following procedures:

- ▶ Notify the Site Manager or HSS, and RFP OHD;
- ▶ Bring the victim indoors and quickly rewarm the affected areas in water between 102° to 105°F;
- ▶ Give victim a warm drink--NOT coffee, tea, or alcohol;
- ▶ Do not permit the victim to smoke;
- ▶ Keep the frozen parts in warm water or covered with warm cloths for 30 minutes, even though the tissue will be painful as it thaws;
- ▶ Evaluate the injured areas and cover with sterile, soft, dry material;
- ▶ Keep the victim warm and get immediate medical care;
- ▶ Do not rub the frostbitten part;
- ▶ Do not allow blisters to be broken;
- ▶ Do not use ice, snow, or anything cold on frostbite;
- ▶ Do not use heat lamps or hot water bottles to rewarm the body part;
- ▶ Do not place the affected part near a hot stove; and,
- ▶ Decontaminate the victim only after the frostbite situation is rectified and initiation of decontamination is approved by a physician.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

109 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

First aid for excessive exposure to cold (hypothermia) consists of the following procedures:

- ▶ Call - 2911 - Occupational Health for Assistance;
- ▶ Bring victim into a warm area as quickly as possible;
- ▶ Remove wet or cold garments;
- ▶ Dry the person thoroughly;
- ▶ Provide warm, dry clothing or covering;
- ▶ Provide rapid but gentle rewarming;
- ▶ Give victim a warm drink--NOT coffee, tea, or alcohol;
- ▶ Keep the victim warm and get immediate medical care; and,
- ▶ Decontaminate the victim only after the frostbite situation is rectified and initiation of decontamination is approved by a physician.

### 8.4.5 Emergency Services

Emergency telephone numbers are listed in Table 8-2.

### 8.4.6 Notification Requirements

Reporting and notification of emergency situations shall be carried out in accordance with requirements in Department of Energy (DOE) Order 5484.1. The Team Leader of the field team involved will notify the Site Safety Officer who will notify the appropriate emergency assistance personnel (for example, fire, police, ambulance) at extension 2911 immediately, and

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

110 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

then notify the Site Manager. The Site Manager will notify the EG&G Environmental Restoration (ER) Program Field Supervisor, PM, and Health and Safety Officer. The responsibility of the HSS is to implement notification and reporting requirements of DOE Order 5484.1.

### 8.4.7 Spills

If a spill occurs during drum sampling or repackaging, the spilled material will be flushed into the equipment decontamination pad floor sump. The spilled material will then be handled just as other environmental wastes that enter the sump.

If minor leak occurs in a liquid waste holding tank, the tank contents will be pumped into a different holding tank. The EG&G project managers will be notified of leakage from any tank containing RCRA-regulated materials and any need for repair or replacement of the holding tank. If a major leak occurs the DF workers will notify the fire department closest to the DF, and notify the EG&G project manager.

### 8.4.8 Thunderstorms and Tornadoes

A severe thunderstorm watch or a tornado watch announcement on radio or television indicates that a severe thunderstorm or tornado is possible. Work will continue at the work site during severe thunderstorm watches or tornado watches. A severe thunderstorm warning or a tornado warning signifies that a severe thunderstorm or a tornado has been sighted or detected by radar and may be approaching. All work on site shall cease during a thunderstorm, severe thunderstorm warning, or tornado warning.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

111 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

Personnel on site during a tornado shall take the following steps:

- ▶ Evacuate office trailers or vehicles;
- ▶ If outdoors, lie flat in a nearby ditch;
- ▶ Stay away from power poles, electrical appliances, and metal objects; and,
- ▶ Do not try to outrun a tornado.

### 8.4.9 Adverse Weather

In the event of adverse weather, the HSS will determine if work can continue without sacrificing the health and safety of site personnel. Some of the items to be considered prior to determining if work should continue are:

- ▶ High winds;
- ▶ Heavy rainfall;
- ▶ Potential for heat stress;
- ▶ Potential for cold stress;
- ▶ Tornadoes;
- ▶ Limited visibility;
- ▶ Electrical storms;
- ▶ Potential for accidents; and,
- ▶ The malfunctioning of monitoring equipment.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

112 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 8.4.10 Electric Shock

All electrical shocks shall be considered as a physical injury and will be handled as described in Subsection 8.4.2. In addition, the following requirements will be followed.

- ▶ All electric shocks are accidents and must be reported;
- ▶ Employees who attempt to rescue shock victims must not endanger themselves or others; and,
- ▶ The electrical source should be de-energized immediately if the victim is still in contact with electrical energy.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

113 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 9.0 LOGS, REPORTS, AND RECORDKEEPING

#### 9.1 General

Records shall be kept documenting the site safety program. A bound logbook will be used by the HSS/HSST to record results of each environmental monitoring event within the exclusion zone.

#### 9.2 Personnel Records

Records shall be kept for each on-site individual. Records include a medical clearance statement from a qualified physician, fit test, and training documentation. When site safety meetings are conducted, an attendance sheet that includes the subjects briefed must be kept.

#### 9.3 Calibration Records

All radiological monitoring equipment will be calibrated as described in ANSI N323-1978 "Radiation Protection Instrument Test and Calibration" and EG&G directives. All monitoring equipment used for health and safety purposes will be calibrated as suggested by the manufacturer. Records of all calibrations will be maintained.

#### 9.4 Occupational Safety and Health Administration Form (OSHA FM) 200

An OSHA Form 200 will be posted in an area frequented by all personnel. The HSS will be responsible for maintaining the form.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

114 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 9.5 Health and Safety Logbook

A separate health and safety logbook and sign in/sign out log shall be maintained by the HSS throughout the project and turned in to the EG&G Project Manager after the project is completed. Logged information shall include:

- ▶ Names of all subcontract personnel entering and leaving the site each day;
- ▶ Description of unforeseen hazards and steps taken to mitigate hazards;
- ▶ Summary of telephone conversations regarding health and safety;
- ▶ Monitoring results;
- ▶ Safety infractions, if any;
- ▶ Accidents and injuries; and,
- ▶ All other significant health and safety items.

### 9.6 Accident/Incident Reporting

#### 9.6.1 Subcontractor Procedures

In the event of an accident or incident, the HSS will immediately notify the Site Manager, Site Safety Officer (SSO), and EG&G project manager. Types of accidents or incidents that are considered reportable are listed in ADM 1601.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

115 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

Work will be suspended to correct the cause of the accident/incident and to modify this HASP as necessary.

An accident/incident report form must be submitted to the EG&G Project Manager (PM) within 24 hours of occurrence.

### 9.6.2 Rocky Flats Plant Procedures

In accordance with the Site Health and Safety Plan (HSP) Section 3.03, the HSS will notify the Project Manager, the RFP Environmental Restoration (ER) Program Field Supervisor, the RFP ER Program Manager, and the RFP Site Health and Safety Coordinator of any accidents or incidents that occur during field activities. The Health and Safety Specialist will also submit a completed DOE Form F 5484.1 for any of the following incidents:

1. "Recordable" occupational injuries or illnesses as defined below:

OCCUPATIONAL INJURY is any injury such as a cut, fracture, sprain, or amputation that results from a work accident or from an exposure involving a single incident in the work environment. NOTE: Conditions resulting from animal or insect bites, or one-time exposure to chemicals, are considered to be injuries.

OCCUPATIONAL ILLNESS of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion, or direct contact with a toxic material.

2. PROPERTY DAMAGE LOSSES of \$1,000 or more are reported as follows: accidents that cause damage to Department of Energy (DOE) property, regardless of fault, or accident wherein DOE may be liable for damage to a second party, are reportable if damage is \$1,000 or more. Include damage to facilities,

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

116 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

inventories, equipment, and properly parked motor vehicles. Exclude damage resulting from a DOE reportable vehicle accident.

3. GOVERNMENT MOTOR VEHICLE ACCIDENTS resulting in damages of \$500 or more, or involving injury, are reported unless the government vehicle is not at fault, damage of less than \$500 is sustained by the government vehicle, or no injury is inflicted on the government vehicle occupants. Accidents are also reportable to DOE if:
  - Damage to DOE property is greater than or equal to \$500 and the driver of a government vehicle is at fault;
  - Damage to any private property or vehicle is greater than or equal to \$500 and the driver of a government vehicle is at fault; and,
  - Any person is injured and the driver of a government vehicle is at fault.
4. AUTOMOBILE ACCIDENTS require completion of Standard Form 91 and Optional Form 26 by involved drivers. These forms may be obtained from Occupational Safety.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

117 of 119

Effective Date:

APR 15 1994

Organization:

Environmental Management

---

### 10.0 REFERENCES

Interagency Agreement (IAG), 1990. Draft. The U.S. Department of Energy, U.S. Environmental Protection Agency, and the Colorado Department of Health.

Interagency Agreement (IAG), 1991. Final. The U.S. Department of Energy, U.S. Environmental Protection Agency, and the Colorado Department of Health.

Rockwell International Corporation, 1988. Draft Remedial Investigation and Feasibility Study Plans for Low Priority Sites. Volume I. Site Descriptions, Groupings and Prioritization.

U.S. Department of Energy (DOE), 1980. Final Environmental Impact Statement. Rocky Flats Plant Site, Golden, Colorado (Final Statement to ERDA 1545-D), 3 volumes. DOE/EIS-0064, UC-2, 11. April.

U.S. Department of Energy (DOE), 1986a. Comprehensive Environmental Assessment and Response Program (CEARP), Phase I Installation Assessment. Rocky Flats Plant, Albuquerque Operations Office.

U.S. Department of Energy (DOE), 1986b. Resource Conservation and Recovery Act (RCRA), Part B Operating Permit Application for Rocky Flats Plant Hazardous and Radioactive Mixed Wastes. CO7890010526.

U.S. Department of Energy (DOE), 1986c. Resource Conservation and Recovery Act (RCRA), Part B Operating Permit Application for Rocky Flats Plant Transuranic (TRU) Mixed Wastes. CO7890010526.

U.S. Department of Energy (DOE), 1987. RCRA 3004(u) Waste Management Units. Appendix 1 of the Rocky Flats Plant RCRA Part B Operating Permit Application.

U.S. Department of Energy (DOE), 1988. Closure Plan, Container Storage Facilities: Property Utilization and Disposal Container Storage Facilities, Swinerton and Walberg Building 980 Container Storage Facility, Swinerton and Walberg Contractor Storage Yard, Building 885 Drum Storage Area, Building 881 Drum Storage Area, Building 865 Drum Storage Area, Building 883 Drum Storage Area, Building 334 Cargo Container Area, Building 444/453 Drum Storage Area, Rocky Flats Plant.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

EG&G ROCKY FLATS PLANT

Manual:

RFP/ER-SAF-93-DCON

Revision No.:

0

Page:

118 of 119  
APR 15 1994

Effective Date:

Organization:

Environmental Management

U.S. Department of Energy (DOE), 1990. Final Phase III RFI/RI Work Plan, Rocky Flats Plant 881 Hillside Area (Operable Unit No. 1). Rocky Flats Plant, Golden, Colorado. October.

U.S. Department of Energy (DOE), 1991a. Phase II RFI/RI/FS Work Plan (Alluvial), 903 Pad, Mound, and East Trenches Areas (Operable Unit 2). Rocky Flats Plant, Golden, Colorado.

U.S. Department of Energy (DOE), 1991b. Phase II RFI/RI Work Plan (Bedrock), 903 Pad, Mound, and East Trenches Areas (Operable Unit 2). Rocky Flats Plant, Golden, Colorado.

U.S. Department of Energy (DOE), 1991c. Draft Final RFI/RI Work Plan for Operable Unit 3. Rocky Flats Plant, Golden, Colorado.

U.S. Department of Energy (DOE), 1991d. Draft Final Phase I RFI/RI Work Plan, Solar Evaporation Ponds (Operable Unit No. 4). Rocky Flats Plant, Golden, Colorado.

U.S. Department of Energy (DOE), 1991e. Environmental Assessment, Dewatering and RCRA Partial Closure Action on Solar Evaporation Ponds. Rocky Flats Plant, Golden, Colorado, DOE/EA-0487. June.

U.S. Department of Energy (DOE), 1991f. Final Phase I RFI/RI Work Plan, Rocky Flats Plant Woman Creek Priority Drainage (Operable Unit No. 5). Rocky Flats Plant, Golden, Colorado. October.

U.S. Department of Energy (DOE), 1991g. Final Phase I RFI/RI Work Plan, Rocky Flats Plant Walnut Creek Priority Drainage (Operable Unit No. 6). Rocky Flats Plant, Golden, Colorado. Vol. 1. September.

U.S. Department of Energy (DOE), 1991h. Phase I RFI/RI Work Plan, Present Landfill, IHSS 1:14, and Inactive Waste Storage area, IHSS 203 (Operable Unit No. 7).

U.S. Department of Energy (DOE), 1991i. Final Phase I RFI/RI Work Plan, Rocky Flats Plant Original Process Waste Lines (Operable Unit No. 9). Rocky Flats Plant, Golden, Colorado. November.

## DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN

---

**EG&G ROCKY FLATS PLANT**

**Manual:**

**RFP/ER-SAF-93-DCON**

**Revision No.:**

**0**

**Page:**

**119 of 119**

**Effective Date:**

**APR 15 1994**

**Organization:**

**Environmental Management**

---

U.S. Department of Energy (DOE), 1991j. Draft Final Phase I RFI/RI Work Plan, Rocky Flats Plant Other Outside Closures (Operable Unit No. 10). Rocky Flats Plant, Golden, Colorado. November.

U.S. Department of Energy (DOE), 1991k. Final Phase I RFI/RI Work Plan, West Spray Field (Operable Unit No. 11). Rocky Flats Plant, Golden, Colorado. December 18.

U.S. Department of Energy (DOE), 1992a. Draft Historical Release Report for the Rocky Flats Plant.

U.S. Department of Energy (DOE), 1992b. Draft Phase I RFI/RI Work Plan, Rocky Flats Plant Site 700 Area (Operable Unit 8). Rocky Flats Plant, Golden, Colorado.

**TABLE 5-1**  
**COMPOUNDS OF CONCERN**

PARAMETER	
RADIOLOGICAL	METALS
Gross Alpha	Aluminum
Gross Beta	Arsenic
Gamma	Barium
	Calcium
	Cadmium
	Cobalt
MISCELLANEOUS	Chromium
Nitrate/Nitrite	Copper
Chloride	Iron
Sulfate	Potassium
Total Dissolved Solids	Lithium
Total Suspended Solids	Magnesium
	Manganese
	Molybdenum
	Sodium
	Nickel
ORGANICS	Lead
Chloroform	Antimony
Carbon Tetrachloride	Selenium
Trichloroethene	Silicon
1,1,2,2-Tetrachloroethane	Strontium
p-Xylene	Thallium
m-Xylene	Vanadium
Methylene Chloride	Zinc
	Iron, Total

Note:

Compounds listed were detected at least once in decontamination water samples collected between July and September 1993.

**TABLE 6-1****SIGNS AND SYMPTOMS OF HEAT STRESS**

Stress Type	Cause	Symptoms
Heat rash	continuous exposure to heat or humid air	red, itchy rash on the body
Heat cramps	heavy sweating with inadequate electrolyte replacement	muscle spasms, pain in the hands, feet, and abdomen
Heat exhaustion	increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration	pale, cool, moist skin, heavy sweating, dizziness, nausea, fainting
Heat stroke	The most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained.	red, hot, and usually dry skin, lack of or reduced perspiration, nausea, dizziness or confusion, strong and rapid pulse, coma.

The determination of WBGT requires the use of a black globe thermometer, a natural (static) wet-bulb thermometer, and a dry-bulb thermometer, such as the Reuter-Stokes, Thermo-environmental Monitor (WIBGET). Calculated WBGT values will be compared to the permissible heat exposure limits provided in Table 6-2.

**TABLE 6-2**  
**PERMISSIBLE HEAT EXPOSURE LIMITS**  
Adapted From the ACGIH 1993-1994 TLVs  
(Values are given in °C and °F WBGT)\*

Level of PPE	Work-Rest Regimen each hour	Work Load in WBGT					
		Light <sup>(a)</sup>		Moderate <sup>(b)</sup>		Heavy <sup>(c)</sup>	
		°C	°F	°C	°F	°C	°F
Summer work Uniform	Continuous Work	30.0	86	26.7	80	25.0	77
	75% Work / 25% Rest	30.6	87	28.0	82	25.9	78
	50% Work / 50% Rest	31.4	89	29.4	85	27.9	82
	25% Work / 75% Rest	32.2	90	31.1	88	30.0	86
Cotton Coveralls	Continuous Work	28.0	82	24.7	76	23.0	73
	75% Work / 25% Rest	28.6	83	26.0	78	23.9	74
	50% Work / 50% Rest	29.4	85	27.4	81	25.9	78
	25% Work / 75% Rest	30.2	86	29.1	84	28.0	82
Winter work Uniform	Continuous Work	26.0	79	22.7	73	21.0	70
	75% Work / 25% Rest	26.6	80	24.0	75	21.9	71
	50% Work / 50% Rest	27.4	82	25.4	78	23.9	75
	25% Work / 75% Rest	28.2	83	27.1	81	26.0	79
Water barrier, permeable	Continuous Work	24.0	75	20.7	69	19.0	66
	75% Work / 25% Rest	24.6	76	22.0	71	19.9	67
	50% Work / 50% Rest	25.4	78	23.4	74	21.9	71
	25% Work / 75% Rest	26.2	79	25.1	77	24	75

\* As workload increase, the heat stress impact on an unacclimated worker is exacerbated. For unacclimatized workers performing a moderate level of work the permissible heat exposure TLV should be reduced by approximately 2.5°C.

- (a) Light = sitting or standing to control machinery, performing light hand or arm work.
- (b) Moderate = walking about with moderate lifting or pushing
- (c) Heavy = pick and shovel work, hand augering

Comments: For situations other than those listed above, personal heat stress monitoring is required.

**TABLE 7-1****ENVIRONMENTAL MANAGEMENT RADIOLOGICAL GUIDELINES**

<b>EMRG No.</b>	<b>Title</b>
EMRG 1.0	Organization and Responsibilities
EMRG 1.1	Gama Radiation Surveys
EMRG 1.2	Beta Radiation Surveys
EMRG 1.3	Posting of Radiation Protection Requirements
EMRG 2.1	Personnel Contamination Monitoring
EMRG 2.2	Possible Inhalation Exposure
EMRG 2.3	Wounds and Skin Contamination
EMRG 3.1	Performance of Surface Contamination Surveys
EMRG 3.2	Survey Requirements for Conditional and Unrestricted Use
EMRG 3.5	Handling of Contaminated Dosimetry/Security Badges
EMRG 6.1	Performance Test and Operational Checks for Ludlum Model 12-A, Model 12, and Model 31 Survey Instruments
EMRG 6.3	Performance Checking and Operation of the Eberline SAC-4 Alpha-Scintillation Smear Counting Instrumentation
EMRG 6.4	Performance Testing and Operation of the Eberline BC-4 Beta Smear Counting Instrumentation
EMRG 6.5	Use of the Bicorn Frisk-Tech with the A-100 and B-50 Detectors
EMRG 6.6	Use of the Bicorn Fidler (Field Instrument for the Detection of Low-Energy Radiation)
EMRG 9.1	Respiratory Protection Requirements and Posting
EMRG 10.1	Radiological Deficiency Reporting Program

**TABLE 7-2**

**PPE ACTION LEVELS FOR COMPOUNDS OF CONCERN**

Compound	Level C Action Level	Level B Action Level
Chloroform	--	1 ppm
Carbon Tetrachlorethane	--	1 ppm
Trichloroethene	12.5 ppm	1000 ppm
1,1,2,2-tetrachloroethane	--	0.5 ppm
Xylenes	50 ppm	1000 ppm
Methylene Chloride	--	<25 ppm (ALARA)

TABLE 7-3

## TASK-SPECIFIC PPE REQUIREMENTS

Task and Activity	PPE Requirements	Text Reference
FO.01: Air Monitoring and Dust Control	Not Applicable.	7.51
FO.03: General Equipment Decontamination		7.3, 7.5.2
- Radiological Surveys	Level D unless results exceed EMRG 3.1, then Level C.	
- Decontamination	Air Monitoring, then Modified Level D with coated coveralls, faceshield, nitrile or butyl gloves, unless survey results exceed EMRG 3.1, then Level C.	
FO.04: Heavy Equipment Decontamination		7.3, 7.5.3
- Radiological Surveys	Level D unless results exceed EMRG 3.1, then Level C.	
- Decontamination	Air Monitoring, then Modified Level D with coated coveralls, faceshield, nitrile or butyl gloves, unless survey results exceed EMRG 3.1, then Level C.	
FO.05: Handling of Purge and Development Water	Level D plus earplugs, nitrile or butyl gloves, splash apron.	7.5.4
FO.06: Handling of Personal Protection Equipment	Level D plus nitrile or butyl gloves.	7.5.5

TABLE 7-3

## TASK-SPECIFIC PPE REQUIREMENTS

Task and Activity	PPE Requirements	Text Reference
FO.07: Handling of Decontamination Water and Wash Water		7.3, 7.5.6
- Transfer	Level D plus nitrile or butyl gloves.	
- Pumping	Level D plus ear plugs, nitrile or butyl gloves, splash apron.	
- Sampling	Air monitoring, then Modified Level D plus coated coveralls, and nitrile or butyl gloves.	
FO.10: Receiving, Labeling, Handling Environmental Materials Containers	Level D plus hard hats if lifting over 72", and leather gloves is handling sharp objects.	7.5.7
FO.11: Field Communications	Not Applicable.	7.5.8
FO.12: Decontamination Facility		7.3, 7.5.9
Operations		
- Transfer Operations	Level D plus ear plugs, nitrile or butyl gloves, splash apron.	
- Mixing	Modified Level D with coated coveralls.	
- Pumping	Modified Level D with faceshield, ear plugs, and splash apron.	
- Sampling	Air monitoring, then Modified Level D with faceshield, ear plugs, and splash apron.	
- Decanting	Modified Level D with faceshield, ear plugs, splash apron.	

TABLE 7-3

## TASK-SPECIFIC PPE REQUIREMENTS

Task and Activity	PPE Requirements	Text Reference
FO.13: Contamination, Preserving, Handling, and Shipping of Soil and Water Samples		7.3, 7.5.10
- Sampling	Air monitoring, then Modified Level D with coated coveralls.	
- Sample Preservation	Modified Level D with faceshield and splash apron.	
- Handling	Level D with nitrile or butyl gloves.	
- Shipping	Not Applicable.	
FO.15: Photoionization Detectors (PID) and Flame Ionization Detectors (FID)		7.3, 7.5.11
- DF Inspections	Air monitoring, then Modified Level D.	
FO.16: Field Radiological Measurements		7.5.12
- RCA	Modified Level D with uncoated coveralls, or Level C if required by RWP.	
- non-RCA	Level D with nitrile or butyl gloves.	
FO.18: Environmental Sample Radioactivity Screening	Not Applicable.	7.5.13
FO.25: Shipment of Radioactive Materials Samples	Not Applicable.	7.5.14
Other DFSC Tasks	Air monitoring as necessary, then Level D with hard hat if lifting higher than 72".	7.3, 7.5.15

**TABLE 8-1****EMERGENCY ALARMS**

<b>WARNING</b>	<b>SOUND</b>	<b>INSTRUCTIONS</b>
Fire Alarm	Bell	Evacuate area
Civil Defense Warning Alarm	High Frequency Pitch Steady Tone	Follow public address instruction and building announcements
Civil Defense Attack Alarm	Wailing Siren	Follow public address instructions
Criticality Alarm	Wailing Tone	Evacuate building and assemble in evacuation area
Glovebox Overheat Alarm	Wavering Tone	Follow building instructions Ventilation shuts off
SAAM Alarm	Wavering Tone	Follow building instructions Ventilation shuts off
General Fire Alarm in Plutonium/Uranium Processing Plant	Wavering Tone	Evacuate area

**TABLE 8-2**

**EMERGENCY TELEPHONE NUMBERS**

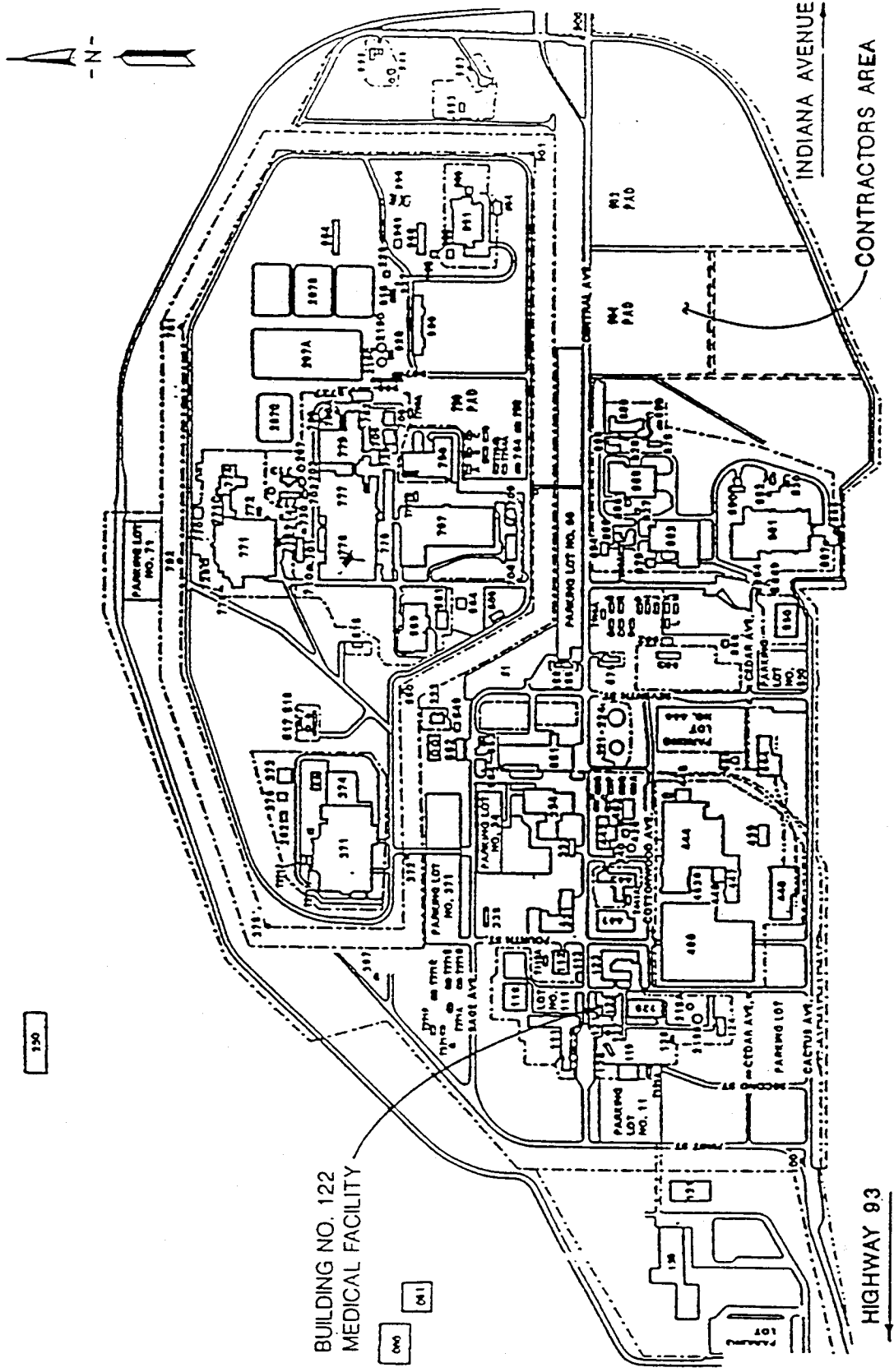
Site Health and Safety Officer	(303) 966-5356
24-Hour Installation Health/Safety Coordinator	(303) 966-2911
Fire	(303) 966-2911
Ambulance	(303) 966-2911
Poison Center	(303) 629-1123
Security	(303) 966-2911
Police	(303) 966-2911
NEAREST MEDICAL SERVICES ARE LOCATED AT:	Building 122


Directions to Medical Services:

From the Contractor's trailer compound, take a northbound street to Central Avenue and turn left onto Central Avenue: Building 122 will be on the left side and slightly west of a guard building on the right after approximately 1.25 miles.

From the RFP eastern boundary, upon entering RFP from Indiana Street, you will be on Central Avenue. Proceed approximately 3.5 miles: Building 122 will be on the left side.

From the RFP western boundary at Hwy. 93, proceed along the entrance road to just past the gate, at which time you will be eastbound on Cactus Avenue. Then turn left onto the first street past Second Street, (Third Street, which is not marked). Proceed up Third Street past Building 125, which is on the left: the next building on the left will be the medical facility (Building 122).



CLIENT/PROJECT				EG&G - ROCKY FLATS DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN				 Golder Associates				Denver, Colorado				TITLE				MEDICAL FACILITY MAP							
DRAWN		BDL		CHECKED		CER		REVIEWED		WEH		DATE		MARCH 1994		SCALE		NTS		FILE NO.		JOB NO. 933-2672		DWG NO./REV.NO.		FIGURE 8-1	

## **APPENDIX A**

### **RESPONSIBILITIES AND AUTHORITY OF HEALTH AND SAFETY PERSONNEL**

## **APPENDIX A**

### **RESPONSIBILITIES AND AUTHORITY OF HEALTH AND SAFETY PERSONNEL**

#### **ENVIRONMENTAL MANAGEMENT (EM) HEALTH AND SAFETY OFFICER (HSO)**

##### Responsibilities

The HSO will ensure that the radiological aspects of project-specific documents meet the criteria established in EG&G Rocky Flats Plant Site-Wide Standard Operating Procedures (SOPs).

#### **EM RADIOLOGICAL ENGINEER (EMRE)**

##### Responsibilities

- Establish qualifications for the Health and Safety Specialist (HSS) position
- Review the credentials of prospective HSSs and, when appropriate, approve individuals to complete tasks reserved for HSSs
- Review and approve subcontractor-prepared training programs that are designed to qualify a subcontractor employee to serve as an HSS
- Prepare Environmental Management Radiological Guidelines (EMRGs) that address subjects such as, but not limited to, survey methods, documentation, frequencies, and locations
- Establish survey and sampling strategies for property that cannot be surveyed in accordance with the standard techniques outlined in existing EMRGs, and ensure that property to be released for unrestricted use does not exceed the limits specified in DOE Order 5400.5 (Reference 5.2)
- Provide guidance on the performance of the procedures and techniques utilized in field operations for surface contamination surveys
- Specify work controls for radiologically controlled areas, or review and approve work controls prepared by Subcontractors.
- Review and approve selected radiation survey reports
- Investigate unanticipated survey results such as a lack of radioactivity when radioactivity is known to be present, or radiation levels exceeding anticipated levels
- Oversee Radiation Work Permit (RWP) program administration

**APPENDIX A**  
**(Continued)**

---

- Oversee Radiological Deficiency Report (RDR) program administration
- Sign, or designate a representative to sign, forms such as property releases
- Perform dose reconstruction for personnel whose dosimeters have been contaminated or are deemed "unreadable"
- Determine the appropriate posting and control of radiologically contaminated sites and approve the deposting of signs
- Evaluate Possible Inhalation Exposures and decide on appropriate actions
- Evaluate possible wound and skin contamination incidents
- Provide support for the evaluation and control of work requiring respiratory protection
- Perform all additional specific procedural duties relating to EM field activities detailed in the Radiological Engineering Procedures Manual, applicable Radiological Engineering documents, and the applicable HSP manual
- Stop work authority when unacceptable radiological conditions or hazards exist.

**DECONTAMINATION FACILITY SUBCONTRACTOR (DFSC) - PROJECT MANAGER**

Responsibilities

- Direct the development of a formal training program designed to qualify subcontractor employees to be designated as HSSs by the EMRE. The training program will include classroom sessions and supervised field work, and will be submitted to the EMRE for approval
- Direct and monitor the implementation of the health and safety program
- Advise personnel on health and safety matters
- Issue directives, advisories, and information to the Corporate Health and Safety Manager (CHSM)
- Advise the CHSM on the policy, liability, and professional issues
- Assure that adequate funds are allocated to fully implement project health and safety plans

## **APPENDIX A (Continued)**

---

- Nominate Site Safety Officer (SSOs) and Health and Safety Specialists (HSSs) for EMRE approval

### **Authority**

- Direct changes in the health and safety program
- Determine and implement personnel disciplinary actions, as required
- Approve and audit project health and safety expenditures

## **CORPORATE HEALTH AND SAFETY MANAGER (CHSM)**

### **Responsibilities**

- Track health and safety regulations and implement improvements to the health and safety program
- Ensure records are maintained pertaining to medical surveillance, training, fit testing, chemical exposure, and incidents
- Update health and safety manual
- Manage medical surveillance program
- Ensure health and safety training is obtained
- Provide industrial hygiene/chemical safety guidance to SSOs
- Audit key aspects of health and safety program and report effectiveness to project manager
- Investigate reports of incidents or accidents
- Provide guidance on radiological issues.

### **Authority**

- Approve the qualifications of employees to work at the decontamination pads
- Establish employee training and medical surveillance procedures

## **APPENDIX A**

### **(Continued)**

---

- Suspend work on any project that jeopardizes the health and safety of personnel
- Access project files to perform health and safety audits or investigate accidents/incidents
- Remove individuals from projects if their conduct jeopardizes their health and safety or that of co-workers

### **SITE SAFETY OFFICER (SSO)**

#### **Responsibilities**

- Implement the applicable Site-Specific HSP (SSHSP) and verify compliance with all applicable health and safety requirements
- Ensure that updated copies of the Health and Safety Plan (HSP), applicable SSHSP, EMRGs, and all documents referenced by the EMRGs, are available to subcontractor employees
- Supervise HSSs in the performance of their responsibilities
- Ensure HSSs and subcontractor employees are advised of the radiological hazards, both expected and suspected, by posting and controlling radiological areas according to EMRG instructions
- Ensure that HSP 18.19, "Criteria and Actions for Potential Intakes", is adhered to for the duration of the project
- Verify that performance of EG&G and subcontractor-owned instruments has been conducted in accordance with the manufacturer's recommendations. The SSO will also ensure that the test results are recorded daily in a calibration log specific to each instrument
- Review and approve completed survey reports/forms. If an unsatisfactory report/form is received, it will be returned to the appropriate individual(s) for correction. When conducting that review the SSO will ensure that:
  - the correct report/form is complete
  - the entries are reasonable
  - the required signatures are affixed to the report

## APPENDIX A (Continued)

---

- Forward approved survey reports/forms to the EMRE and maintain a file of all completed Radiological Survey Forms. This file will be organized by survey areas, with an index placed in the front of the file
- Immediately contact the EMR by phone when survey results indicate radiation levels exceeding 5 millirems/hour (mrem/h). For contaminant radiation levels requiring access controls not already established, or levels exceeding an established action level, the EMRE will also be notified
- Maintain an Instrumentation Field Log Book which documents the specific equipment used at the work site
- Interface with project manager in matters of health and safety
- Report to CHSM and project manager on health and safety matters
- Develop or review project health and safety plans prior to submittal to EG&G for review
- Conduct staff training and orientation on health and safety related activities
- Monitor compliance with health and safety plans and conduct site audits
- Assist project managers with obtaining required health and safety equipment
- Ensure compliance to relevant and appropriate OSHA requirements.

### Authority

- Suspend work or otherwise limit exposures to personnel if health and safety plans appear to be unsuitable or inadequate or if health or safety of personnel is endangered
- Direct personnel to change work practices if existing practices are deemed to be hazardous to health and safety of personnel
- Remove personnel from projects if their actions or condition endanger their health and safety or the health and safety of co-workers

## **APPENDIX A**

### **(Continued)**

---

#### **SITE MANAGER**

##### Responsibilities

- Assure that the project is performed in a manner consistent with the health and safety program
- Assure that the project health and safety plan is prepared, approved, and properly implemented
- Provide the SSO with the information needed to develop health and safety plans
- Coordinate with the SSO and project manager on health and safety matters
- Assure compliance with health and safety plans
- Assure that Environmental Management Division Operating Procedures are maintained and that the Health and Safety Specialist (HSS) reviews Document Change Notices for any health and safety implications

##### Authority (Safety Related)

- Assign SSO-approved HSS to project and, if necessary, assign a suitably qualified replacement
- Temporarily suspend field activities if health and safety of personnel are endangered, pending an evaluation by the SSO or CHSM
- Temporarily suspend an individual from field activities for infractions of the Health and Safety Plan, pending an evaluation by the SSO or CHSM

#### **HEALTH AND SAFETY SPECIALIST (HSS)**

##### Responsibilities

- Conduct surveys and document the results, as required by the EMRGs, the applicable SSHSP, and the EG&G Rocky Flats Plant Site-Wide SOPs
- Supervise Health and Safety Specialist-in-Training (HSST) during field activities
- Countersign all reports/forms completed by the HSST
- Forward completed survey reports/forms to the SSO

## APPENDIX A (Continued)

---

- Notify the SSO of survey results that indicate radiation levels exceeding 5 mrem/h, levels requiring access controls not already established, or levels exceeding an established action level
- Control access and advise all personnel when radiological precautions are required
- Complete performance and operational checks required for radiation instruments and make entries in the Instrumentation Field Log Book
- Direct health and safety activities on site
- Provide a copy of the Health And Safety Plan to all field crews
- Report immediately all safety-related incidents or accidents to the SSO and project manager
- Assist project managers in all aspects of implementing health and safety plans
- Maintain health and safety equipment on site
- Implement emergency procedures as required
- Be approved by EG&G Radiological Engineering and Industrial Hygiene to conduct radiological monitoring procedures as outlined by EMRGs and complete all other related tasks assigned to Health and Safety Specialist-in-Training (HSST).
- Maintain a file of Environmental Management Radiological Guidelines (EMRGs) and complete all responsibilities assigned to the Health and Safety Specialist
- Review Document Change Notices (DCNs) to Environmental Management Division Operating Procedures and, when necessary, implement appropriate health and safety procedures
- Conduct monitoring for chemical and physical hazards

### Authority

- Temporarily suspend field activities if health and safety of personnel are endangered, pending further consideration by the HSO and/or CMHS
- Temporarily suspend an individual from field activities for infractions of the Health and Safety Plan, pending further consideration by the HSO and/or CMHS

## **APPENDIX A**

### **(Continued)**

---

#### **HEALTH AND SAFETY SPECIALIST-IN-TRAINING (HSST):**

The HSST shall assist the HSS in implementing this plan. An HSST will be present in the immediate vicinity during all field activities.

#### **Responsibilities**

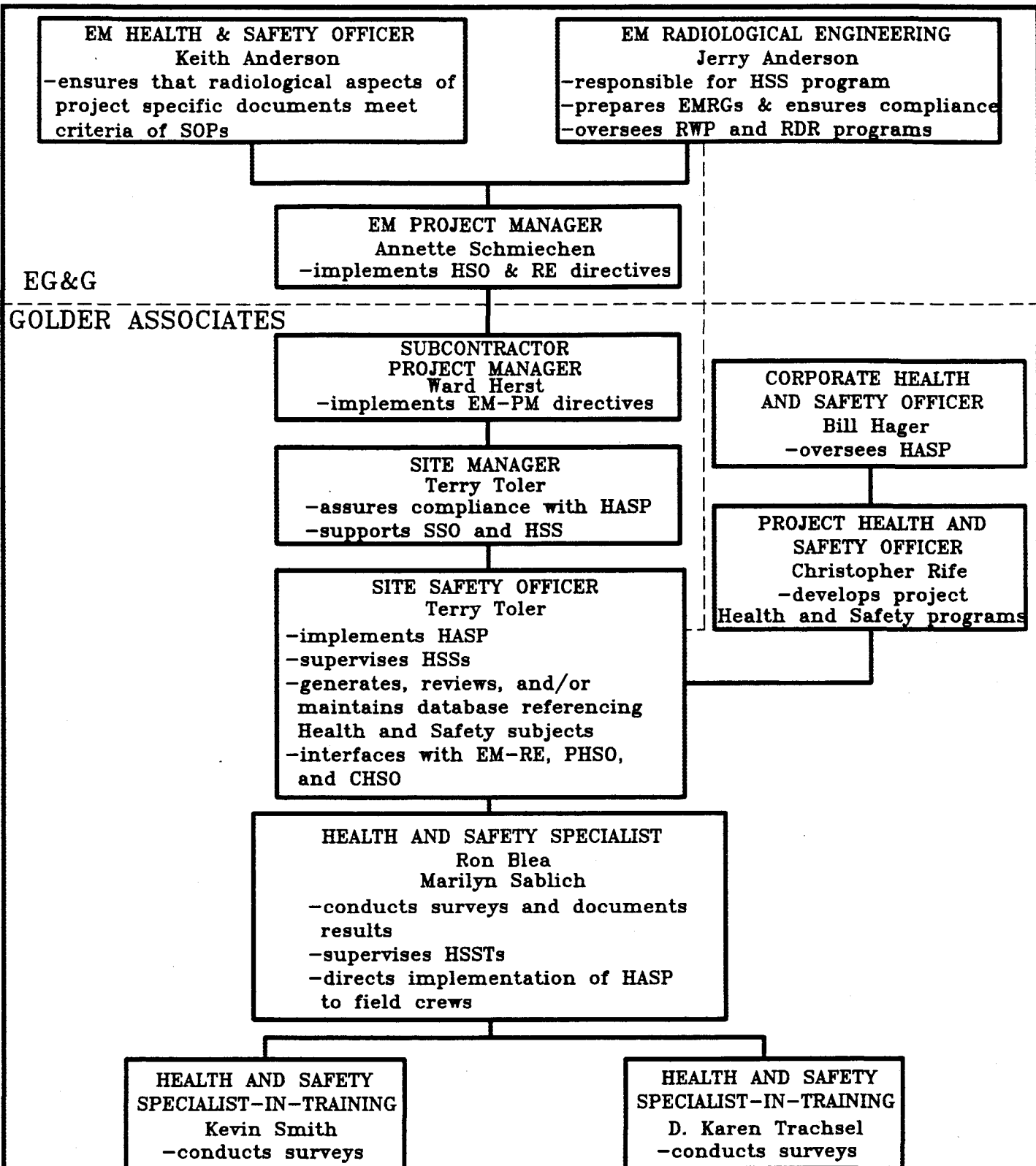
- Participate in a formal training program designed to qualify subcontractor employees to be designated as Health and Safety Specialists by the EMRE
- Conduct surveys and document the results as required by the EMRGs, the applicable SSHSP, and the EG&G Rocky Flats Plant Site-Wide SOPs
- Notify the HSS of unanticipated radiation and contamination levels such as a lack of radioactivity where radioactivity is known to be present, or radiation or contamination levels exceeding anticipated levels
- Request HSS countersignatures on all survey reports
- Post required signs according to EMRG instructions
- Ensure that each individual within his/her jurisdiction complies with the provisions of this plan
- Audit safety practices used by on-site teams
- Provide on-site air monitoring during field activities, if necessary
- Communicate with command post for on-site activities
- Supervise decontamination, monitor workers for heat or cold stress, and distribute health and safety equipment if certified by RE and IH to perform these tasks
- Document safety practices
- Initiate appropriate emergency procedures
- Be in an approved program by EG&G Radiological Engineering to conduct radiological monitoring procedures as outlined by EMRGs and complete all other related tasks assigned to Health and Safety Specialist-in-Training (HSST).

**APPENDIX A**  
**(Continued)**


---

Authority

- The HSST shall have the authority to stop work in case of an imminent safety hazard or potentially dangerous situation; after stopping work, the HSST shall immediately consult the HSS and EG&G project manager.



Note: Responsibilities presented herein are summarized from Appendix A data. For full details, please refer to specific titles and responsibilities presented in Appendix A.

 <b>Golder Associates</b> Denver, Colorado	TITLE <h2 style="text-align: center;">HEALTH AND SAFETY RESPONSIBILITY FLOW CHART</h2>			
CLIENT/PROJECT <b>EG&amp;G - ROCKY FLATS DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN</b>	DRAWN PGQ CHECKED CER REVIEWED WH	DATE MAR 1994 SCALE FILE NO. 2672A001	JOB NO. 933-2672 DWG NO./REV. NO. 2672A001 FIGURE NO. A-1	

**APPENDIX B**

**CHARACTERISTICS OF RADIOISOTOPES  
FOUND AT ROCKY FLATS PLANT**

The DOE Rocky Flats Plant produces "triggers" for nuclear weapons, which involves the processing and machining of plutonium, as well as the use of beryllium and other materials. Uranium and other radionuclides are known to be present on the site, either from process operations or from the disposal of wastes from other facilities.

Normal process releases from this facility are reported to be minimal, although there are several historical incidents that have released significant quantities of contaminants.

Plutonium can spontaneously combust in air, a characteristic which contributed to serious fires that released plutonium to the environment in 1957 and 1969. In 1969 a glovebox fire resulted in the release of several kilograms of plutonium to the environment. Analysis of soil samples, taken mostly east of DOE property, found up to 6 pCi/g on the top centimeter of soil (background is 0.04 pCi/g) shortly after this fire. In 1974 there was another accidental release of plutonium to the air.

Starting in 1958, barrels containing used machining fluids were stored outdoors at a location now called the 903 Pad. Leakage from the barrels was discovered in 1964. By 1968, the last barrels had been removed and the area was monitored for alpha activity. Levels of up to 13.5  $\mu$ Ci/g of soil were found, with activity penetrating to 8 inches deep. Rocks were removed from the area and fill was applied to the storage area, which was then paved. Additional fill was added to the area surrounding the 903 Pad in 1970 after soil sample analysis revealed greater than 50 pCi/g of alpha activity.

Other sites on the facility that may be significant contaminant sources include the West Spray Fields, an area east of the plant used for burial called the East Mounds, the 881 Hillside area, and the solar evaporation ponds. With the exception of the West Spray Fields, all of these locations are to the east of the new sanitary landfill sites.

The distribution of radioactive dusts in the environment is driven by prevailing wind patterns and drainage patterns at the Plant site. Both the prevailing winds and drainage patterns are west-to-east, with a significant north/south component for prevailing winds. This can be verified

by the distribution of radionuclides in the soil as reported by Rocky Flats Plant annual environmental reports.

Expected concentrations of plutonium near the areas of this work is thought to be approximately 0.05 pCi/gm (0.02 pCi/g [0.04 dis/min/g] is considered background). This level is well below levels considered hazardous. Reasonable dust control measures in areas containing 0.05 pCi/gm will provide adequate protection against exposure to plutonium by inhalation.

Elevated levels of plutonium have been measured in various areas in the buffer zone around the Rocky Flats Plant, primarily to the east of the facility. The highest levels of plutonium measured are to the east and south of the Plant, with the principal source being the 903 Pad. Soils at Indiana Avenue have been found to have an activity of 7.34 pCi/g.

#### Radionuclides of Concern

##### $\text{Pu}^{239}$

The predominant isotope present as an environmental contaminant is  $\text{Pu}^{239}$ . Major radiations from this material include the following:

alpha ( $\text{He}^{2+}$ )	5.16 MeV (88%)
	5.11 MeV (11%)

$\text{Pu}^{239}$  emits very little gamma (photons) of low energy, the most important being:

0.052 MeV (0.020%)

$\text{Pu}^{239}$  is beta ( $e^-$ ) stable.

The radiation of concern (alpha) is not sufficiently penetrating to penetrate the dead layers of the skin, which means  $\text{Pu}^{239}$  is not an external hazard. However, it is very important to avoid

inhalation or ingestion of this material, as alpha radiation may be very damaging from within the body.

#### $\text{Am}^{241}$

$\text{Am}^{241}$  is a contaminant of weapons-grade plutonium, present at less than 20% of the concentration of  $\text{Pu}^{239}$ . Major radiations from this material include the following:

alpha ( $\text{He}^{2+}$ )	5.49 MeV (85%)
	5.44 MeV (13%)

$\text{Am}^{241}$  emits some gamma (photons) of low energy, the most important being:

0.060 MeV (36%)

$\text{Am}^{241}$  is beta stable.

The radiation of concern (alpha) is not sufficiently penetrating to penetrate the dead layers of the skin, which means  $\text{Am}^{241}$  is not an external hazard. However, it is very important to avoid inhalation or ingestion of this material, as alpha radiation may be very damaging from within the body.

#### $\text{U}^{235}$

$\text{U}^{235}$  is also known to be present in some soils at this site.  $\text{U}^{235}$  is normally present as 0.7 percent of the total uranium present. Major radiations from this material include the following:

alpha ( $\text{He}^{2+}$ )	4.58 MeV (8%)
	4.40 MeV (57%)
	4.37 MeV (18%)

Gamma emissions are principally due to the presence of thorium daughter radiations, the most important being:

0.143 MeV (11%)

0.185 MeV (54%)

0.204 MeV (5%)

$U^{235}$  is beta stable.

The radiation of concern (alpha) is not sufficiently penetrating to penetrate the dead layers of the skin, which means  $U^{235}$  is not an external hazard. However, it is very important to avoid inhalation or ingestion of this material, as alpha radiation may be very damaging from within the body. At concentrations much higher than are expected to be present at this site,  $U^{235}$  can be an external hazard from daughter gamma emissions.

$U^{238}$

$U^{238}$  is also known to be present in some soils at this site.  $U^{238}$  is normally present as 99.276 percent of the total uranium present. Major radiations from this material include the following:

alpha ( $He^{2+}$ )	4.20 MeV (75%)
	4.15 MeV (25%)
	4.37 MeV (18%)

Gamma emissions are principally due to the presence of daughter radiations, principally from  $Th^{234}$  and  $Pa^{234m}$ .

Beta emissions include:

( $e^-$ )	0.030 MeV
	0.043 MeV

The radiation of concern (alpha) is not sufficiently penetrating to penetrate the dead layers of the skin, which means  $U^{238}$  is not an external hazard. However, it is very important to avoid inhalation or ingestion of this material, as alpha radiation may be very damaging from within

the body. At concentrations much higher than are expected to be present at this site,  $U^{238}$  can be an external hazard from daughter gamma emissions. The beta emissions are not sufficiently energetic to penetrate the outer (dead) layers of skin.

## **APPENDIX C**

### **LIST OF CHEMICAL SUBSTANCES FOUND AT ROCKY FLATS PLANT**

**Note:**

The reader should keep in mind that a material safety data sheet (MSDS) for a given substance provides information concerning the substance in a relatively pure form and that the substances that may be encountered during this project will be at very low concentrations from the view point of significant occupational exposures. MSDSs for chemicals of concern are kept on EG&G Environmental Restoration Office (T891E). Analyte concentrations for combined operable units 1-6 and Upper and Lower Interceptor ditches are provided in Table B-1.

**APPENDIX D**

**EXAMPLE ON-THE-JOB  
TRAINING (OJT) FORM**

Name: \_\_\_\_\_ Extension \_\_\_\_\_  
Job Title: \_\_\_\_\_ Department or Company: \_\_\_\_\_  
Job Code: \_\_\_\_\_ Organization Code: \_\_\_\_\_  
Employee #/SSN: \_\_\_\_\_  
Supervisor: \_\_\_\_\_ Extension \_\_\_\_\_ Mail Stop \_\_\_\_\_

**PART ONE**

Required for Admittance to RFP Courses 018-691-02 and 018-691-03

**TSD WORKERS**

At RFP, hazardous waste generators place RCRA hazardous waste in drums at satellite or 90 day storage areas. Waste generators are not generally considered "hazardous waste workers" under OSHA. (Hazardous waste generators receive Hazard Communication training to learn about the hazards of the chemicals with which they work)

1. Will you repackage drums of RCRA regulated waste *after* they have been initially packaged by the generator? ☐ No ☐ Yes
2. Will you be directly involved in RCRA hazardous waste treatment? ☐ No ☐ Yes  
If 'Yes', at what location? \_\_\_\_\_
3. Are you potentially exposed to hazardous waste at a permitted or interim status TSD storage area during routine (non-emergency) operations? ☐ No ☐ Yes

**ENVIRONMENTAL RESTORATION SITE WORKERS**

At RFP, environmental restoration sites are referred to as "operable units" or OU's. When an OU exists in a building, *only* the portion of the building scheduled for environmental investigation or remediation is considered the OU.

4. Will you perform or field supervise environmental investigation or remediation activities at an OU? ☐ No ☐ Yes
5. Will you perform maintenance or other non-environmental activities at an OU? ☐ No ☐ Yes  
If 'Yes', what activities? \_\_\_\_\_
6. Will you tour or audit an OU? ☐ No ☐ Yes

If You Checked "Yes" to Any of Items 4-6, Complete the Following:

7. Will you be required to wear Level A or B PPE at an OU? ☐ No ☐ Yes
8. Will you be required to wear Level C PPE at an OU? ☐ No ☐ Yes

**IF YOU CHECKED "YES" TO ANY OF ITEMS 1-6, COMPLETE THE FOLLOWING:**

8. Are you likely to perform any of tasks 1-5 for 30 or more days per year? ☐ No ☐ Yes
9. Are you likely to wear a respirator for 30 or more days per year? ☐ No ☐ Yes

Supervisor \_\_\_\_\_  
Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_  
Employee \_\_\_\_\_  
Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

**FOR INDUSTRIAL HYGIENE REPRESENTATIVE ONLY**

Date Form Received \_\_\_\_\_ Date Form Completed \_\_\_\_\_

- Employee Requires: (check one) ☐ 24-Hour, #018-691-02 ☐ 40-Hour, #018-691-03 ☐ No HAZWOPER Training  
(check one) ☐ 1 Day Field Experience ☐ 3 Day Field Experience ☐ No Field Experience  
(check one) ☐ Hazardous Waste Medical Surveillance ☐ No Hazardous Waste Medical

Industrial \_\_\_\_\_  
Hygiene Rep. \_\_\_\_\_  
Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

**PART TWO: FIELD EXPERIENCE CERTIFICATION  
FOR HAZARDOUS WASTE OPERATIONS INITIAL TRAINING**

\* Part Two is only required for work in an OU, it is not required for work in a TSD.

**FOR PERFORMANCE BASED TRAINING REPRESENTATIVE ONLY**

Employee has Completed: (check one) ☐ 24-Hour, #018-691-02 ☐ 40-Hour, #018-691-03  
and per Part One requires: (check one) ☐ 1 Day Field Experience ☐ 3 Day Field Experience

PBT

Representative \_\_\_\_\_  
Print Name Signature Date

**TO DOCUMENT TRAINING FROM SOURCE OTHER THAN ROCKY FLATS PLANT**

Employee has Completed: (check one) ☐ 24-Hour ☐ 40-Hour  
Course Source \_\_\_\_\_ Course Date \_\_\_\_\_  
and requires: (check one) ☐ 1 Day Field Experience ☐ 3 Day Field Experience  
or has attached proof of: (check one) ☐ 1 Day Field Experience ☐ 3 Day Field Experience

Supervisor

\_\_\_\_\_   
Print Name Signature Date

Use letters a through j from the following list to complete the table at the bottom of this form. Enter each task applicable on a separate line. Only enter time for tasks completed in an OU.

**Environmental Restoration Tasks**

- a. Site reconnaissance, inspection or audit
- b. Drilling or similar activity  
soil boring, well installation, cone penetrometer
- c. Environmental media sampling  
soil, soil gas, surface water, groundwater
- d. Excavation
- e. Contaminant treatment system installation,  
operation or maintenance
- f. Other, specify \_\_\_\_\_

**Routine Maintenance or General Labor Tasks  
(Non-environmental)**

- g. Utilities system maintenance  
water, electricity, sewer
- h. Soil disturbance  
excavations, grading, hand digging
- i. Equipment maintenance
- j. Other, specify \_\_\_\_\_

Tasks Completed (a-j)	OU #	Date(s)	Time (Hours)
Total Time (Hours)			

Student has completed at least: ☐ 1 Day (8 hours) ☐ 3 Days (24 hours) of supervised work in an OU  
(check one) Course #009-691-01 Course #018-691-07

Supervisor

\_\_\_\_\_   
Print Name Signature Date

Employee

\_\_\_\_\_   
Signature Date

**APPENDIX E**

**SPECIAL TASK HEALTH AND SAFETY PLAN**

---

**DECONTAMINATION FACILITY SUBCONTRACTOR  
SPECIAL TASK  
HEALTH AND SAFETY PLAN  
Revision Level\_\_  
Job No.**

---

Page 1 of 14

1. Items 1-9 to be completed by EG&G special task project manager.

Project Name \_\_\_\_\_

Task \_\_\_\_\_

Requested by \_\_\_\_\_

Proposed Start-Up Date \_\_\_\_\_ 19 Project/Task No. \_\_\_\_\_

Rev. Level \_\_\_\_\_

Prepared by/Reviewed by Decontamination Facility Subcontractor Health and Safety Officer

Printed Name \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_ 19

Reviewed by Decontamination Facility Subcontractor Site Safety Officer

Printed Name \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_ 19

Approved by EG&G Special Task Project Manager

Printed Name \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_ 19

Title \_\_\_\_\_

Note to Project Managers:

A signed and completed copy of the Health and Safety Plan and a signed and completed copy of the safety briefing (p. 14) must be included in the project file.

2. Project Description:

3. Location:

4. Facility/Work Site Description:

5. Proposed Personnel and Tasks:

Project Manager \_\_\_\_\_

Field Team Leader \_\_\_\_\_

Proposed Field Team

Job Function/Tasks

**6. Confined Space Entry**

A confined space is defined as any space not currently used or intended for human occupancy, having a limited means of egress, which is subject to the accumulation of toxic contaminants, a flammable or oxygen deficient atmosphere, or other hazards, such as engulfment, or electrical or mechanical hazards should equipment be inadvertently activated while an employee is in the space. Confined spaces include but are not limited to storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, air pollution control devices, smoke stacks, underground utility vaults, sewers, septic tanks, and open top spaces more than four feet in depth such as test pits, waste disposal trenches, sumps and vats.

Will this task require entry into any confined or partially confined space? ☐ YES - Describe below  
☐ No

**7. Cutting and Welding**

Will this task involve use of a cutting torch or welding? ☐ YES - Describe below  
☐ No

**8. Other Potential Hazards**

<input type="checkbox"/> Chemical	<input type="checkbox"/> Trips, Slips, Falls
<input type="checkbox"/> Radiological	<input type="checkbox"/> Trenching/Shoring
<input type="checkbox"/> Fire/Explosion	<input type="checkbox"/> Heavy Equipment/Vehicular Traffic
<input type="checkbox"/> Heat Stress	<input type="checkbox"/> Overhead Hazards
<input type="checkbox"/> Electrical	<input type="checkbox"/> Unstable/Uneven Terrain
<input type="checkbox"/> Machinery/Mechanical Equipment	<input type="checkbox"/> Other - Describe below

**6,7,8 Description/Other**

9. I, \_\_\_\_\_, attest that this information is accurate to the best of my knowledge and hereby request a Health and Safety Plan for the task(s) designated above.

\_\_\_\_\_  
Signature\_\_\_\_\_  
Date\_\_\_\_\_  
Title

## 10. Chemical/Radiological Hazard Evaluation

## Waste Media

- ☐ Airborne Contamination
- ☐ Surface Contamination
- ☐ Contaminated Soil
- ☐ Contaminated Groundwater
- ☐ Contaminated Surface Water
- ☐ Solid Waste
- ☐ Liquid Waste
- ☐ Sludge

## Hazardous Characteristics

- ☐ Ignitable
- ☐ Corrosive
- ☐ Reactive
- ☐ Explosive
- ☐ Toxic (non-radiological)
- ☐ Radioactive

## Substance

This task will involve the reasonable possibility of exposure to the substances listed below at concentrations or in quantities which may be hazardous to the health of the site personnel.

Primary Hazard (Rate: low, med, high, ext)

Substance	Inhalation of Gases/ Vapors	Inhalation of Dusts/ Mists	Ingestion	Dermal Absorption of Solids/ Liquids and/or Skin Contam.	Dermal Absorption of Gases/ Vapors	Corrosive/ Irritant	Ignit- ability	Reactivity/ Explosion
-----------	-----------------------------------	----------------------------------	-----------	--	---	------------------------	-------------------	--------------------------

Substance

Exposure Limit

IDLH Level

Health Effects

**11. Ambient Air/Site Monitoring Procedures**

The following instruments shall be used to monitor the work environment and workers' breathing zones prior to site entry and at the specified intervals.

Instrument	Monitoring Frequency				
____ PID (HNU, OVM) w/____eV lamp	Cont.	15min.	30min.	hourly	other _____
____ OVA	Cont.	15min.	30min.	hourly	other _____
____ Combustible Gas Indicator	Cont.	15min.	30min.	hourly	other _____
____ H2S Detector	Cont.	15min.	30min.	hourly	other _____
____ Colorimetric Detector Tubes	Cont.	15min.	30min.	hourly	other _____
____ Other (describe below)	Cont.	15min.	30min.	hourly	other _____

Description/Other:

**12. Action Levels**

Task personnel shall observe the following Action Levels:

Instrument

Action Level

Specific Action

13. Personal Monitoring

☐ Passive Dosimeter

☐ Personal Air Sampling

☐ Other

Description/Other:

14. Biological Monitoring/Medical Surveillance

☐ This project requires medical surveillance or biological monitoring procedures beyond the provisions of the routine medical surveillance program, see description below

Description:

15. Onsite Control

Control boundaries have been established, and the Exclusion Zone (the contaminated area), Hotline, Decontamination Line, Contamination Control Zone and Support Zone (clean area) have been designated and are identified as follows:

(Name) \_\_\_\_\_ has been designated to coordinate access control on the work site during this task. No unauthorized person shall be allowed beyond the Contamination Control line.

## 16. Personal Protective Equipment

Location	Job Function/Task	Initial Level of Protection						
Controlled Zone		B	C	D	1	2	3	other
		B	C	D	1	2	3	other
		B	C	D	1	2	3	other
Decontamination Zone		B	C	D	1	2	3	other
		B	C	D	1	2	3	other
		B	C	D	1	2	3	other
		B	C	D	1	2	3	other
		B	C	D	1	2	3	other

List the specific protective equipment and material (where applicable) for each of the Levels of Protection identified above

Level B \_\_\_\_\_

- \_\_\_ Pressure demand airline
- \_\_\_ Pressure demand airline with escape provisions
- \_\_\_ Pressure demand SCBA

Level C \_\_\_\_\_

- \_\_\_ Half face Air Purifying Respirator
- \_\_\_ Full face Air Purifying Respirator
- \_\_\_ Full face canister Air Purifying Respirator
- \_\_\_ Standard work clothes
- \_\_\_ Hard hat, steel toed boots, safety glasses
- \_\_\_ Ear protection during drill rig operation
- \_\_\_ Inner latex gloves
- \_\_\_ Outer NBR (Nitrile Butyl Rubber) gloves

Level \_\_\_\_\_

- \_\_\_ Standard works clothes
- \_\_\_ Hard hat, steel toed boots, safety glasses
- \_\_\_ Ear protection during drill rig operation
- \_\_\_ Inner latex gloves
- \_\_\_ Outer NBR gloves

Level \_\_\_\_\_

Where air purifying respirators are authorized, \_\_\_\_\_ are the appropriate canisters/cartridges for use with the specific substances and concentrations anticipated. Cartridges shall be replaced at the start of each work day.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE KNOWLEDGE AND APPROVAL OF THE HEALTH AND SAFETY OFFICER AND THE PROJECT MANAGER

17. Decontamination

Personnel and equipment leaving the Controlled Zone shall proceed through the following decontamination stations and procedures from the decontamination zone:

Personnel Decontamination

Station

Procedure

Equipment Decontamination

Station

Procedure

The following decontamination equipment is required:

Emergency decontamination procedures:

## 18. Confined Entry Procedures \_\_\_\_\_ Not Applicable

Yes N/A

Yes N/A

\_\_\_\_ Provide Forced Ventilation

\_\_\_\_ Refer to Personal Protective Equip. (#16)

\_\_\_\_ Test Atmosphere For:

\_\_\_\_ Refer to Emergency Procedures (#29)

\_\_\_\_ (a) %O<sub>2</sub>

\_\_\_\_ Other Special Procedures

\_\_\_\_ (b) %LEL

\_\_\_\_ (c) Other

Descriptions/Other:

## 19. Cutting/Welding Procedure \_\_\_\_\_ Not Applicable

Yes N/A

\_\_\_\_ Relocate or Protect Combustibles

\_\_\_\_ Wet Down or Cover Combustible Floor

\_\_\_\_ Check Flammable Gas Concentrations (%LEL) in air

\_\_\_\_ Cover Wall, Floor, Duct and Tank Openings

\_\_\_\_ Provide Fire Extinguisher

Other Special Instructions:

**20. Onsite Organization and Coordination**

Project Manager: \_\_\_\_\_

Field Team Leader: \_\_\_\_\_

Site Safety Officer: \_\_\_\_\_

Field Team	Name	Job Function
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**21. Special Instructions**

**22. Sanitation Requirements**

Potable water supply available on work site?

☐ Yes

Portable toilets required on work site?

☐ Yes

If Yes, how many? \_\_\_\_\_

☐ No

Temporary washing/shower facilities required at work site?

☐ Yes

If yes, describe below.

☐ NoIf no, state location  
existing facilities.

Description:

**23. Field Procedures Change Authorization**Instruction Number  
to be changed

Duration of Authorization Requested

Date: \_\_\_\_\_

☐ Today only☐ Duration of Task

Description of Procedures Modification:

Justification:

Person Requesting Change:

Verbal Authorization Received From:

Name

Name

Time

Title

Title

Signature

Approved By

(Signature of person named above to be obtained  
within 48 hours of verbal authorization)

24. **Emergency Procedures** This page is to be posted at prominent location on site.

Yes      No

\_\_\_\_\_ On-site Communications Required?      Emergency Channel \_\_\_\_\_

Nearest Telephone \_\_\_\_\_

#### Fire and Explosion

In the event of a fire or explosion, if the situation can be readily controlled with available resources without jeopardizing the health and safety of yourself, the public, or other site personnel, take immediate action to do so, otherwise:

1. Notify emergency personnel by calling \_\_\_\_\_.
2. If possible, isolate the fire to prevent spreading.
3. Evacuate the area

#### Chemical Exposure

Site workers must notify the site health and safety officer immediately in the event of any injury or any of the signs or symptoms of overexposure to hazardous substances identified below:

Substances Present

Symptoms of Acute Exposure

First Aid

## 24. Emergency Procedures - Cont'd

## On Site Injury Or Illness

In the event of an injury requiring more than minor first aid, or any employee reporting any sign or symptom of exposure to hazardous substances, immediately take the victim to \_\_\_\_\_ located at \_\_\_\_\_, phone \_\_\_\_\_. In the event of life-threatening or traumatic injury, implement appropriate first-aid and immediately call for emergency medical assistance at \_\_\_\_\_. The nearest designated trauma center is \_\_\_\_\_ located at \_\_\_\_\_, phone \_\_\_\_\_.

## Designated Personnel Current in First Aid/CPR (Names)

_____	_____
_____	_____
_____	_____
_____	_____

## Designated Back-Up Personnel (Names)

## Function

_____	_____
_____	_____
_____	_____
_____	_____

## Required Emergency Back-Up Equipment

## Emergency Response Authority

\_\_\_\_\_ is the designated site emergency coordinator and has final authority for first response to on-site emergency situations.

Upon arrival of the appropriate emergency response personnel, the site emergency coordinator shall defer all authority but shall remain on the scene if necessary to provide any and all possible assistance. At the earliest opportunity, the site safety officer or the site emergency coordinator shall contact the project coordinator or health and safety officer.

Project Coordinator \_\_\_\_\_ Phone (w) \_\_\_\_\_ (h) \_\_\_\_\_

Health and Safety \_\_\_\_\_ Phone (w) \_\_\_\_\_ (h) \_\_\_\_\_  
Officer

**25. Safety Briefing**

The following personnel were present at pre-job safety briefing conducted at \_\_\_\_\_ (time) on \_\_\_\_\_  
\_\_\_\_\_ (date) at \_\_\_\_\_ (location), and have read the above plan and are familiar  
with its provisions:

Name

Signature



Fully charged ABC Class fire extinguisher available on site?

YES \_\_\_\_

Fully stocked First Aid Kit available on site?

YES \_\_\_\_

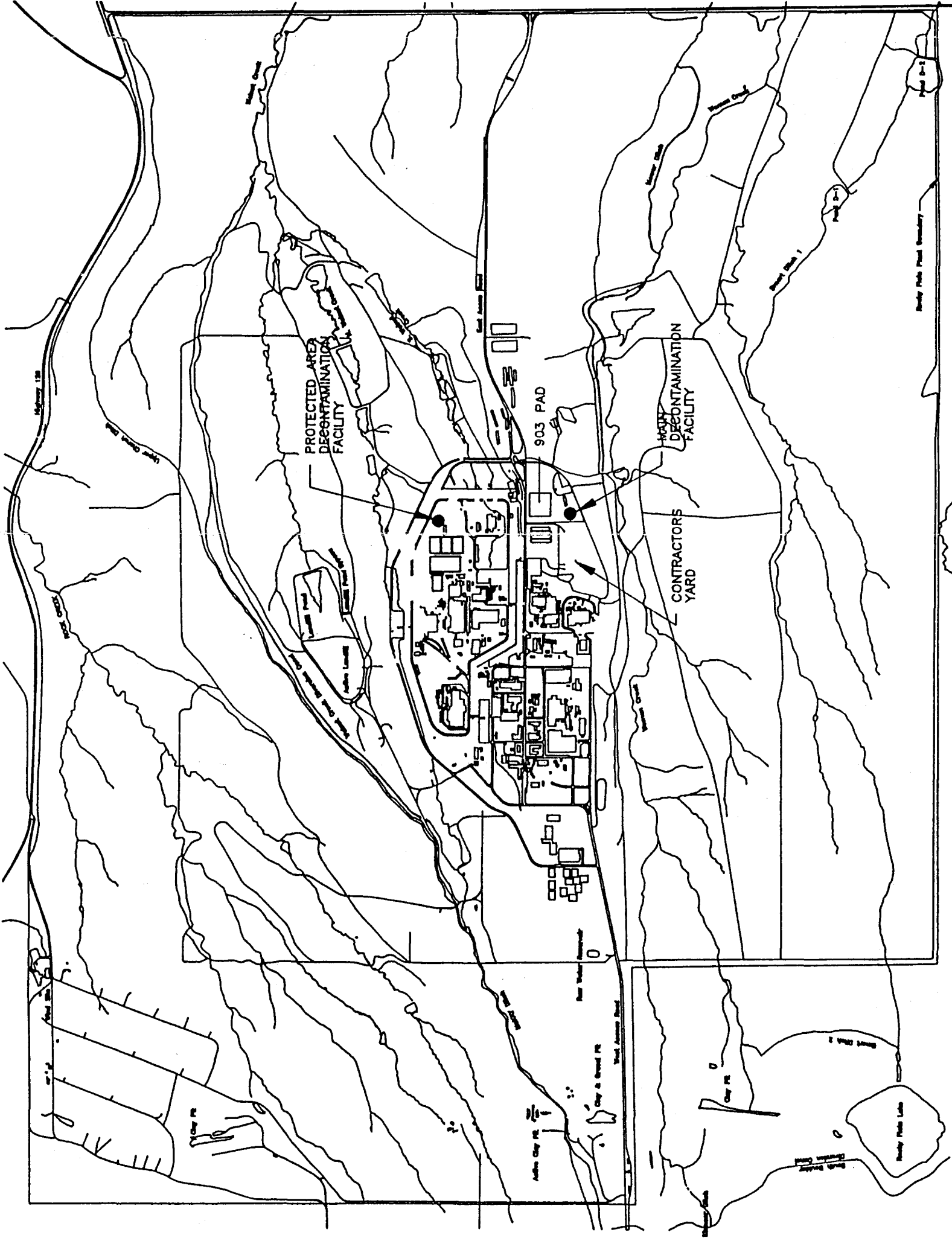
All project personnel advised of location of nearest phone?

YES \_\_\_\_

All project personnel advised of location of designated medical facility or facilities?

YES \_\_\_\_

\_\_\_\_\_  
Printed Name of Field Team Leader or Site Safety Officer\_\_\_\_\_  
Signature\_\_\_\_\_  
Date



SCALE : 1 INCH = 2000 FEET  
2000' 0 2000'

TITLE

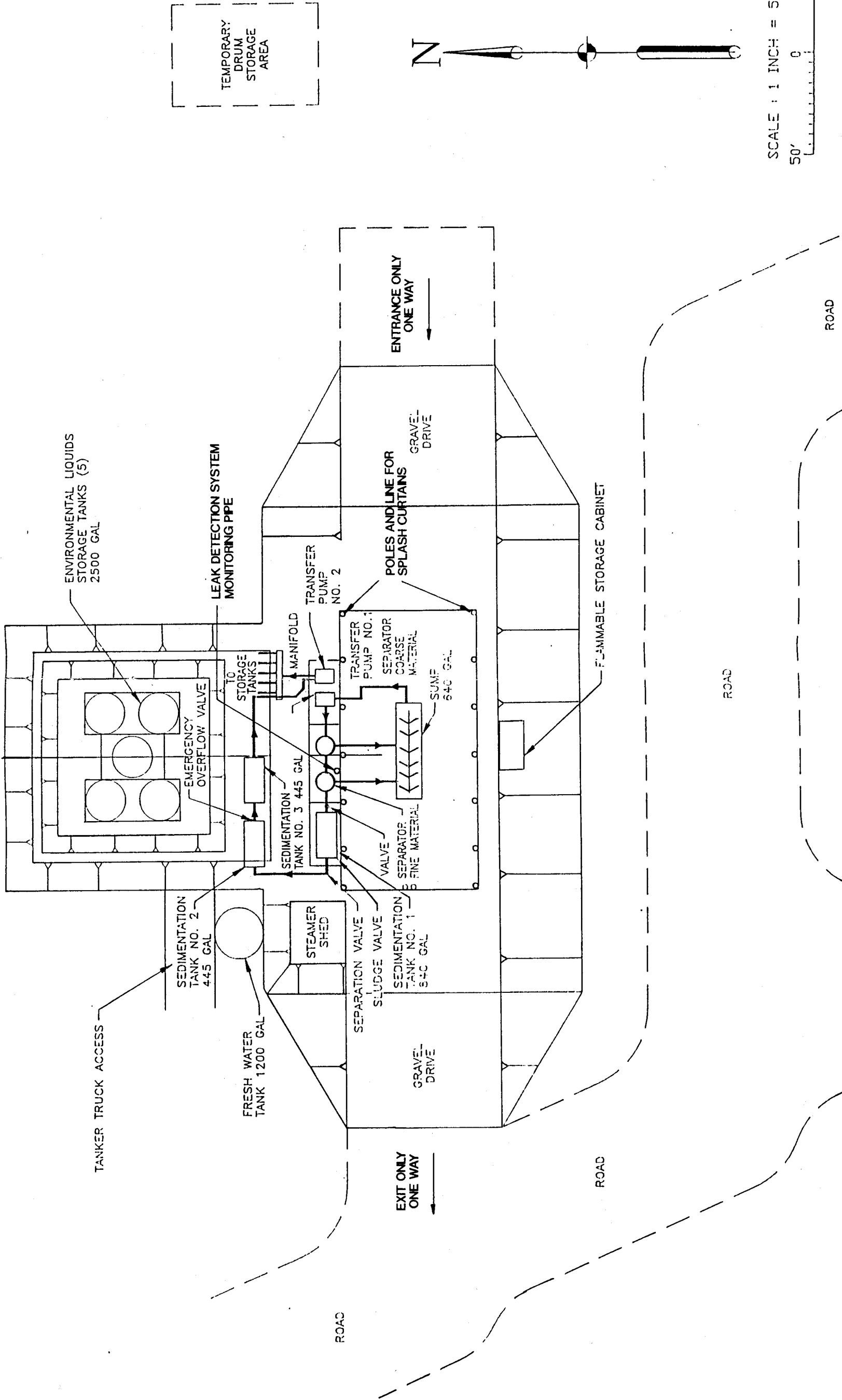
**Golder Associates** Denver, Colorado

**ROCKY FLATS PLANT  
SITE MAP**

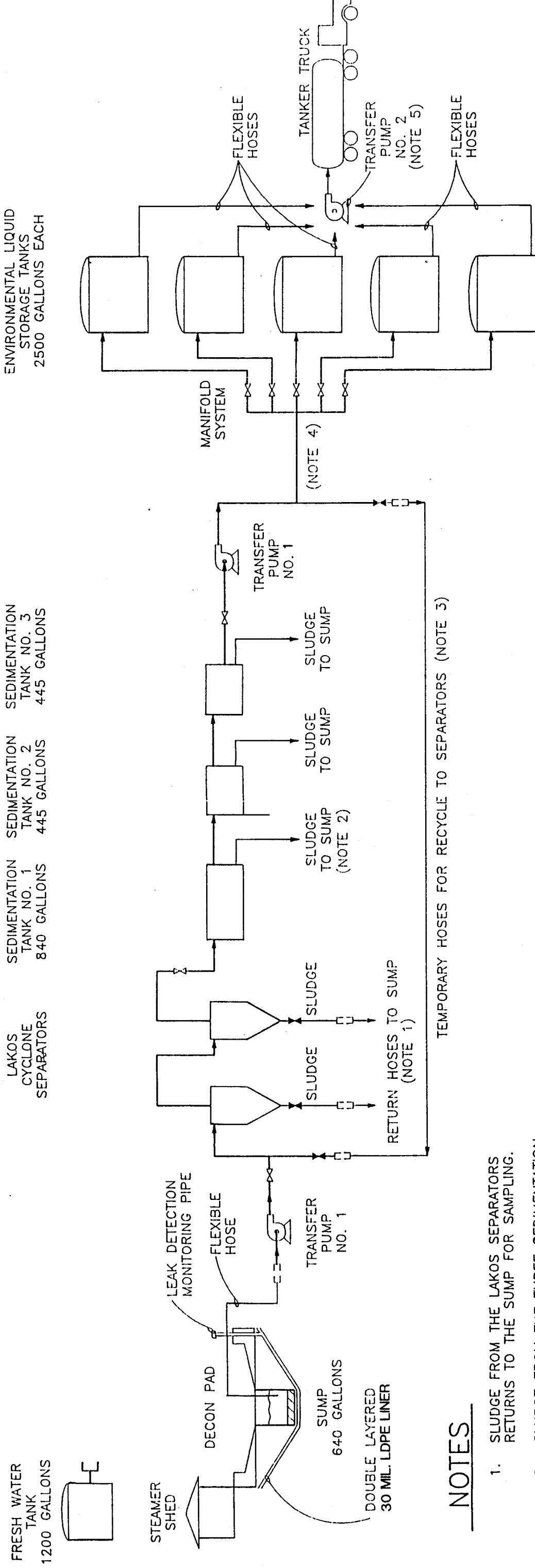
CLIENT/PROJECT **EG&G - ROCKY FLATS  
DECONTAMINATION FACILITY  
HEALTH AND SAFETY PLAN**

DRAWN	BDL	DATE	MARCH 1994	JOB NO.	933-2672
CHECKED	CER	SCALE	AS SHOWN	DWG. NO./REV. NO.	
REVIEWED	WEH	FILE NO.		FIGURE NO.	<b>3-1</b>





TITLE		PROTECTED AREA DECONTAMINATION FACILITY SITE PLAN		
CLIENT/PROJECT	EG&G - ROCKY FLATS DECONTAMINATION FACILITY HEALTH AND SAFETY PLAN	DRAWN	BDL	JOB NO. 933-2672
		CHECKED	CER	DATE MARCH 1994
		REVIEWED	WEH	SCALE T-50'
				FILE NO.
				FIGURE NO. 4-2



TEMPORARY HOSES FOR RECYCLE TO SEPARATORS (NOTE 3)

### NOTES

1. SLUDGE FROM THE LAKOS SEPARATORS RETURNS TO THE SUMP FOR SAMPLING.
2. SLUDGE FROM THE THREE SEDIMENTATION TANKS IS REMOVED BY HAND AND RETURNED TO THE SUMP FOR SAMPLING.
3. WATER FROM THE THIRD SEDIMENTATION TANK CAN BE RETURNED TO THE LAKOS SEPARATORS VIA TRANSFER PUMP NO. 1 IF THE WATER IS DETERMINED THROUGH VISUAL INSPECTION TO BE NOT CLEAR.
4. TRANSFER PUMP NO. 1 ALSO TRANSPORTS WATER THROUGH THE MANIFOLD AND INTO THE SELECTED STORAGE TANKS.
5. FLEXIBLE HOSES CAN BE USED TO ALLOW TRANSFER PUMP NO. 2 TO TRANSPORT WATER FROM THE STORAGE TANKS THROUGH THE MANIFOLD AND TO THE TANKER TRUCK.


 <b>Golder Associates</b> Denver, Colorado		<b>TITLE</b> <b>TYPICAL DECONTAMINATION FACILITY</b> <b>PROCESS FLOW DIAGRAM</b>					
<b>CLIENT/PROJECT</b> <b>EG&amp;G - ROCKY FLATS</b> <b>DECONTAMINATION FACILITY</b> <b>HEALTH AND SAFETY PLAN</b>		<b>DRAWN</b>	<b>BDL</b>	<b>DATE</b>	<b>MARCH 1994</b>	<b>JOB NO.</b>	<b>933-2672</b>
		<b>CHECKED</b>	<b>CER</b>	<b>SCALE</b>	<b>1'-50'</b>	<b>DWG. NO./REV. NO.</b>	
		<b>REVIEWED</b>	<b>WEH</b>	<b>FILE NO.</b>		<b>FIGURE NO.</b>	<b>4-3</b>

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES<sup>1</sup>

Parameter	Groundwater			Surface Water			Soils			Sediments		
	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential <sup>++</sup> ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential <sup>++</sup> ARAR
METALS (TOTAL AND DISSOLVED) (mg/L)												
Aluminum	37.7	0.200	0.2	293	0.200	0.200	70600	40		33900	40	
Antimony	0.628	0.060		0.643	0.060	0.060	57	12	30	69.7	12	
Arsenic	3.0	0.010	0.05	1.03	0.010	0.05	64	2.0		49.2	2	
Barium	0.943	0.200	1.0	11600	0.200	1.0	1899	40	4000	706	40	
Beryllium	0.04	0.005	0.1	0.170	0.005	0.005	18.3	1.0	0.143	15.5	1.0	
Boron	0.218	5.0	5.0									
Cadmium	0.0352 BR	0.005	0.005	25	0.005	0.005	119	1.0		19.5	1.0	
Calcium	99.9 BR	5.000		1590	5.000		254000	2000		132000	2000	
Cesium	0.4	1.000		12	1.000		2410	200		700		
Chromium	0.172 BR	0.010	0.05	0.298	0.010	0.05	781	2.0	8000(III)	64	2.0	
Cobalt	0.22	0.050	0.05	0.489	0.050		88.9	10		43.3	10	
Copper	3.13	0.025	0.2	0.908	0.025	0.025	73.6	5.0		275	5.0	
Iron	76.6	0.100	0.3	3220	0.100	0.30	75900	20		33300	20	
Lead	2.8	0.005	0.05	0.950	0.005	0.005	86.9	1.0		255	1.0	
Lithium	1.79	0.100	2.5	85.2	0.100		100	20		958	20	
Magnesium	788	5.000		391	5.000		23300	2000		103000	2000	
Manganese	11.34	0.015	0.05	27.7	0.015	0.050	3540	3.0		1950	3.0	
Mercury	0.013	0.0002	0.002	3.97	0.0002	0.0002	114	0.2		1.5	0.2	
Molybdenum	1.92 BR	0.200		0.680	0.200		38.65	40	2000	177	40	
Nickel	11.7	0.040	0.2	0.82	0.040	0.4	543	8.0		89.2	8.0	
Phosphorus	1.210	0.040		12	0.040					655	200	
Potassium	7050	5.000		4260	5.000		8020	2000		67000	2000	

\* = Present in laboratory blank

\*\* = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.

J = Analyzed below detection limit

BR = Bedrock (including some weathered bedrock)

+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.

++ = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.A.S.P.), v.1.1, 1990, EG&amp;G Rocky Flats Environmental Restoration Program.

(a) = Plutonium 238 + 239 + 240

(b) = Radium 226 + 228

(c) = Ammonia as N

(d) = Sum of polychlorinated biphenyls (PCBs) in water

1 = Source: U.S. Department of Energy, March 1992, Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

A = This table was reproduced precisely from a previous report.

(4037-200-0004)(HAS-B.TJ)(11-10-92)

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

(Continued)

Parameter	Groundwater			Surface Water			Soils			Sediments		
	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR
Selenium	100.3	0.005	0.010	0.55	0.005	0.005	6.5	1.0		21.3	1.0	
Silicon	56.4	0.010		44	0.010					2470	4.6	
Silver	0.217	0.010	0.050	0.148	0.010	0.010	40.9	2.0	200	411	2.0	
Sodium	4447	5.000		9080	5.000		44000	2000		1480	2000	
Strontium	82.4	0.200		11.9	0.200		1030	40		1230	40	
Thallium	0.544	0.050		0.029	0.050	0.050	5.74	2.0		90	2.0	
Tin	1.121	0.200		1.53	0.200		382	40		1080	40	
Vanadium	0.85	0.050	0.1	1.63	0.050		2590	10		90.4	10	
Zinc	5.0	0.020	2.0	28.7	0.020	0.110	487	4.0		735	4.0	
ANIONS (mg/L)												
Ammonia				65	0.5	0.5						
Chloride	1100	5.0	250	1200	5.0	230	20			210		
Cyanide	3.8	0.01	0.2	0.6	0.01	0.01	19.8			1.0		
Fluoride	8.2	5.0	5.0	7.7	5.0	5.0						
Nitrate as N	1450	5.0	10.0	1186	5.0	10.0	4.3			35.86		
RADIONUCLIDES (TOTAL AND DISSOLVED) (pCi/L)												
Americium 241	9.68	0.01		90	0.01	30	22	0.02		1.467	0.02	
Cesium 137	7.72	1.0		12	1.0		4.7	0.1		32	0.1	

\* = Present in laboratory blank  
 \*\* = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.  
 J = Analyzed below detection limit  
 BR = Bedrock (including some weathered bedrock)

+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.  
 ++ = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.R.A.S.P.), v.1.1, 1990, EG&G Rocky Flats Environmental Restoration Program.  
 (a) = Plutonium 238 + 239 + 240  
 (b) = Radium 226 + 228  
 (c) = Ammonia as N  
 (d) = Sum of polychlorinated biphenyls (PCBs) in water

1 = Source: U.S. Department of Energy, March 1992, Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

4 = This table was reproduced precisely from a previous report.

(4037-200-0004)(14&S-B.TI)(11-10-92)

C-2

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

(Continued)

Parameter	Groundwater			Surface Water			Soils			Sediments	
	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential** ARAR	Maximum +	Potential** ARAR
Gross Alpha	2000	2.0	7.0	2107	2.0	7.0	480	4.0	5.0	77	5.0
Gross Beta	1200	4.0	5.0	3800	4.0	5.0	49.9	10	50.0	53	50
Plutonium 238	0.040	0.01	0.05	0.031	0.01					0.016	
Plutonium 239 + 240	8.13	0.01	15(a)	120	0.01	15(a)	180	0.03	0.9	3.3	0.03
Radium 226	3.54	0.5	5(b)	30	0.5	5(b)	1.9	0.5		1.96	0.5
Radium 228	13.95	1.0	5(b)	52	0.5	5(b)	2.8	0.5		4.41	0.5
Strontium 89 + 90	7.52	1.0		4.27	1.0		1.9	1		2.53	1
Strontium 90	12.4	1.0	8.0	33.34	1.0	8.0	4.57	1		0.99	1
Tritium	12000	400	500	13000	400	500	3.9	400		580	
Uranium 233 + 234	1000	0.6		1050	0.6		3.7	0.3		4.11	0.3
Uranium 233 + 238 + 239	16.9	0.6		14.31	0.6					3.32	0.3
Uranium 235	47	0.6		65.5	0.6		1.01	0.3		1.34	0.3
Uranium 235 + 236	6.90	0.6		47.5	0.6					0.15	
Uranium 238	750	0.6		1211	0.6		3.9	0.3		3.82	0.3
Uranium (Total)	63.7	0.6	5	1023	0.6	5.0	4.0 BR	0.3		4.8	0.3
VOLATILES (ug/L)											
1,1-Dichloroethane	344	5.0		50	5.0		49	5		5.0 J	5.0
1,1-Dichloroethene	48000	5.0	7	143	5.0	7.0	110	5	12000	3.0 J	5.0
1,1,1-Trichloroethane	30250	5.0	200	42	5.0	200	290	5.0	7000000		

\* = Present in laboratory blank  
 \*\* = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.  
 J = Analyzed below detection limit  
 BR = Bedrock (including some weathered bedrock)  
 + = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.  
 ++ = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.R.A.S.P.), v.1.1, 1990, EG&G Rocky Flats Environmental Restoration Program.  
 (a) = Plutonium 238 + 239 + 240  
 (b) = Radium 226 + 228  
 (c) = Ammonia as N  
 (d) = Sum of polychlorinated biphenyls (PCBs) in water  
 1 = Source: U.S. Department of Energy, March 1992, Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.  
 A = This table was reproduced precisely from a previous report.

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

(Continued)

Parameter	Groundwater			Surface Water			Soils			Sediments		Potential** ARAR
	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential** ARAR	Maximum +	Minimum ++	
1,1,2-Trichloroethane	14740	5.0	5.0	6.0	5.0	5.0	62	5.0	120000			
1,1,2,2-Tetrachloroethane	15	5.0	5	440	5.0	5.0						
1,2-Dichloroethane	16000	5.0	5	23			120	5.0	7700			
1,2-Dichloroethene (Total)	14000	5.0	100	460	5.0	100	140	5.0				
1,2-Dichloropropane	6	5.0	5	7.0	5.0	5.0	3.0	5.0				
1,3-Dichloropropene	3	5.0		7.0	5.0	10	6.0	5.0	3900			
2-Butanone	580	10		76	10		530	10.0		12000	10	
2-Chloroethylether				5.0	J		31	J				
2-Hexanone	975	10		87			41					
4-Methyl-2-Pentanone	35	10.0		32	10		120	J		220	10	
Acetone	4100	10.0	4000	970	10	4000	2400	10	8000000	7300	10	
Benzene	83	5.0	5.0	83	5	5	12	J	24000	3.0	J	10
Bromodichloromethane	1.0	5.0	5.0	6.0	5	700						
Bromoform	1.0	5.0	5.0	3.0	5	700						
Bromomethane	7.0	10.0	10	8.0	J	48	6.0	J	30000			
Carbon Disulfide	28	5.0	4000	29	5.0	4000	150	10	8000000	13	J	5.0
Carbon Tetrachloride	28000	5.0	5.0	1005	5.0	5.0	180	5.0	5400			
Chlorobenzene	73	5.0		94	5.0	100	150	55	2000000	4.0	J	5.0
Chloroethane	17	10.0		34	10		50	J				
Chloroform	5427	5.0	5.0	84	5.0	5.0	130	J	110000	18	5.0	5.0
Chloromethane	17	10.0		38	10		60			60	10	

\* = Present in laboratory blank

\*\* = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.

J = Analyzed below detection limit

BR = Bedrock (including some weathered bedrock)

+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.

(a) = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.A.S.P.), v.1.1, 1990, EG&amp;G Rocky Flats Environmental Restoration Program.

(b) = Plutonium 238 + 239 + 240

(c) = Radium 226 + 228

(d) = Ammonia as N

= Sum of polychlorinated biphenyls (PCBs) in water

1 =

A =

Source: U.S. Department of Energy, March 1992. Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

This table was reproduced precisely from a previous report.

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

(Continued)

Parameter	Groundwater			Surface Water			Soils			Sediments		
	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR
Dibromochloromethane	16	5.0	680	5.0	5.0	6.0	780	5.0	8000000	4.0	5.0	
Ethylbenzene	4100	5.0	5.0	340	5.0	5.0	590	5.0	93000	16000	5.0	
Methylene Chloride	9	5.0	100	6.0	5.0	100	17	5.0	23000	2.0	5.0	
Styrene	528000	5.0	5.0	280	5.0	5.0	10000	5.0	140000	8.0	5.0	
Tetrachloroethene	270	5.0	1000	94	5.0	1000	860	5.0	20000000	120	5.0	
Toluene	221860	5.0	5.0	2500	5.0	5.0	17000	5.0	64000	39	5.0	
Trichloroethene	39	10	10	3.0	10	10				57	10	
Vinyl Acetate	930	10	10	25	10	10				7.0	5.0	
Vinyl Chloride	50	5.0	10000	40	5.0	10000	3300	5.0	20000000			
Xylenes (Total)												
SEMIVOLATILES (TOTAL) (ug/L)				(ug/L)			(ug/kg)			(ug/kg)		
Acenaphthene				5.0	J	10	57	J	330	2400	J	330
Acenaphthylene				0.06		0.05				450	J	330
Aldrin				0.01	J	0.05						
Alpha-BHC				2.6		0.5				4.7	J	8.0
Alpha-chlordane				0.18		0.06						
Ametryn				2.0	J	10	180	J	330	2900	J	330
Anthracene				2720.0		0.05						
Atrazine												

\* = Present in laboratory blank

\*\* = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.

J = Analyzed below detection limit

BR = Bedrock (including some weathered bedrock)

+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.

++ = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.A.S.P.), v.1.1, 1990, EG&G Rocky Flats Environmental Restoration Program.

(a) = Plutonium 238 + 239 + 240

(b) = Radium 226 + 228

(c) = Ammonia as N

(d) = Sum of polychlorinated biphenyls (PCBs) in water

i = Source: U.S. Department of Energy, March 1992. Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

Δ = This table was reproduced precisely from a previous report.

(4037-200-0004)(H&S-B.TI)(11-10-92)

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

(Continued)

Parameter	Groundwater			Surface Water			Soils			Sediments		
	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR
Benzo (a) Anthracene				2.0 J	10	10	120 J	330	224	7100	330	
Benzo (b) Fluoranthene				3.0 J	10	10	350 J	330		7100	330	
Benzo (k) Fluoranthene				4.0 J	10	10	320 J	330		6300	330	
Benzo (g,h,i) Perylene							50 J	330		5700	330	
Benzo (a) Pyrene				3.0 J	10.0	10	230 J	330	60.9	6300	330	
Benzo (k) Pyrene							130 J	330				
Benzoic Acid				8.0 J	50		400 J	1600				
Benzyl Alcohol				43	10							
Beta-BHC				0.1	0.05							
Bis (2-ethylhexyl) Phthalate	100 J BR	10	10	220	10	0.05						
Butyl Benzyl Phthalate	2.0 J	10	10	3.0 J	10	3000	18000 *	330	83000	41	330	8.0
4-Chloro-3-methylphenol				1.0 J	10	30	510 J	330		540 J	330	
4-Chlorophenyl Phenyl Ether							740	330				
Chrysene	420	10		2.0 J	10	10	40 J	330				
Cyanazine				0.3	0.1		550 J	330		8200	330	
4,4-DDT				0.06 J	0.1	0.1				95	16	
Delta-BHC				0.02	0.05					3.2 J	8.0	
Dibenzo (a,h) Anthracene										1200	330	
Dibenzofuran				1.0 J						1000 J		
Dicamba				2.1	0.27							
1,4-Dichlorobenzene				4.0 J	10	75						

\* = Present in laboratory blank

++ = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.

J = Analyzed below detection limit

BR = Bedrock (including some weathered bedrock)

+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.

(a) = Plutonium 238 + 239 + 240

(b) = Radium 226 + 228

(c) = Ammonia as N

(d) = Sum of polychlorinated biphenyls (PCBs) in water

1 = Source: U.S. Department of Energy, March 1992. Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

A = This table was reproduced precisely from a previous report.

(4937-200-0004)(H&amp;S-B.TI)(1-10-92)

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES

(Continued)

Parameter	Groundwater			Surface Water			Soils			Sediments		Potential** ARAR
	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential ARAR	Maximum +	Minimum ++	Potential** ARAR	Maximum +	Minimum ++	
Dichloroprop				1.5	0.65							
Diethyl Phthalate				6.0	10	23000	31	330	6000000	1200	330	
Di-n-Butyl Phthalate	170	10	10	20	10	10	3643	J		3100	330	
Di-n-Octyl Phthalate	56	10		24	10		370	J		2000	330	
2,4-Dimethylphenol				6.0	10	2120						
2,4-Dinitrotoluene				4.0	10	10						
Endosulfan												
Ethyl Parathion	0.04			270		0.13				1600	J	8.0
Fluoranthene	10	10		2.0	10	42	1900	330		16000		
Fluorene				3.0	10	10	350	330		2000	J	
Gamma-BHC (Lindane)										50		8.0
Hexachlorobenzene										440	J	
Indeno (1,2,3-cd) Pyrene										5000	J	
Isophorone				1.0	10	10	80	J	330			
2-Methylnaphthalene				21	10					350	J	
2-Methylphenol				43	10					2300		
4-Methylphenol				160	10					2300		
Naphthalene				25	10	10				1100	J	
2-Nitrophenol	3.0	10										
4-Nitrophenol	2.0	50					160	J	1600			
4-Nitroaniline										5300	J	1600

\* = Present in laboratory blank

\*\* = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.

J = Analyzed below detection limit

BR = Bedrock (including some weathered bedrock)

+ = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.

++ = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.A.S.P.), v.1.1, 1990, EG&amp;G Rocky Flats Environmental Restoration Program.

(a) = Plutonium 238 + 239 + 240

(b) = Radium 226 + 228

(c) = Ammonia as N

(d) = Sum of polychlorinated biphenyls (PCBs) in water

1 =

4 =

Source: U.S. Department of Energy, March 1992, Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

This table was reproduced precisely from a previous report.

(4037-200-0004)(HAS-8.17)(11-10-92)

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES  
(Concluded)

Parameter	Groundwater			Surface Water			Soils			Sediments		
	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential <sup>++</sup> ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential <sup>++</sup> ARAR
N-Nitroso-di-n-Propylamine	162	10	10	5	10	10	880	330	2000	•	330	
N-Nitrosodiphenylamine	4.0	50	50	300	10	10	110	1600	350	J	1600	
Pentachlorophenol				20	50	50	500	330	16000	J	330	
Phenanthrene	1.0	10	10	6.0	10	10	320	330	660	J	330	
Phenol				39	10	10						
Prometon				0.09	0.03	0.03						
Prometryn				0.18	0.06	0.06						
Propazine				2.4	0.03	0.03						
Pyrene				4	10	10	880	330	19000	J	330	
Simazine				330	0.06	4.0						
Simetryn				0.64	0.07							
Terbutylazine				1.4								
1,2,4-Trichlorobenzene				4	10	700			4.0	J	330	

• = Present in laboratory blank

•• = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.

J = Analyzed below detection limit

BR = Bedrock (including some weathered bedrock)

•• = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.

•• = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.R.A.S.P.), v.1.1, 1990, EG&G Rocky Flats Environmental Restoration Program.

(a) = Plutonium 238 + 239 + 240

(b) = Radium 226 + 228

(c) = Ammonia as N

(d) = Sum of polychlorinated biphenyls (PCBs) in water

1 = Source: U.S. Department of Energy, March 1992. Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.

Δ = This table was reproduced precisely from a previous report.

TABLE C-1

ANALYTE CONCENTRATIONS FOR COMBINED OPERABLE UNITS 1-16  
AND UPPER AND LOWER SOUTH INTERCEPTOR DITCHES  
(Concluded)

Parameter	Groundwater			Surface Water			Soils			Sediments		
	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential <sup>**</sup> ARAR	Maximum <sup>+</sup>	Minimum <sup>++</sup>	Potential <sup>**</sup> ARAR
POLYCHLORINATED BIPHENYLS (PCBs) (ug/L)												
Aroclor-1254				12	1.0	1.0	440000		0.09	1600000		160

NOTE: Analytical data received prior to October 1988 not subjected to validation procedure. Some of the chemical values reported in this table have not yet been validated, and the analyte list may be changed after the data are validated.

- = Present in laboratory blank
- = These are based on human health and environmental risk assessment criteria developed for screening purposes, or applicable state or federal requirements.
- J = Analyzed below detection limit
- BR = Bedrock (including some weathered bedrock)
- + = Maximum concentration may be a one-time measurement. Values compiled from both recent and historic data, checked against Rocky Flats Environmental Data System.
- ++ = Value given is detection or quantitation limit for analysis, in accordance with Statement of Work for General Radiochemistry and Routine Analytical Services Protocol (G.R.A.S.P.), v.1.1, 1990, EG&G Rocky Flats Environmental Restoration Program.
- (a) = Plutonium 238 + 239 + 240
- (b) = Radium 226 + 228
- (c) = Ammonia as N
- (d) = Sum of polychlorinated biphenyls (PCBs) in water
- 1 = Source: U.S. Department of Energy, March 1992, Annual Report for Treatability Studies at Rocky Flats Plant - Fiscal Year 1991.
- 4 = This table was reproduced precisely from a previous report.